The Monsters of Education Technology

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AUDREY WATTERS
For those who survived, and for those who did not
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INTRODUCTION

When I published the first “Monsters” book in 2014, I wasn’t sure it would become a series. I wasn’t sure people would keep asking me to write and speak about ed-tech. But they have, and it has. Welcome to the fourth installment – a follow-up to 2015’s The Revenge of the Monsters of Education Technology and 2016’s The Curse of the Monsters of Education Technology. The contents, as in previous books, are drawn from the talks I’ve given throughout the year.

I drew the original title – The Monsters of Education Technology – from a keynote I gave at ALTC: “Ed-tech’s Monsters.” It was a talk, in part, about computers and cryptography and surveillance in war; about Mary Shelley’s Frankenstein and Bruno Latour’s reading of its moral: we must love and care for our scientific and technological creations, lest they become monsters. (You know, you can cover a lot of intellectual ground in a keynote if you try. Keynotes get a bad rap thanks to all those who don’t.) “We in ed-tech must face the monsters we have created,” I said in that talk. “These are the monsters in the technologies of war and surveillance a la Bletchley Park. These are the monsters in the technologies of mass production and standardization. These are the monsters in the technologies of behavior modification à la BF Skinner.”

Four books in the series. Four years of traveling and speaking. The monsters haven’t gone away. They thrive.

When I titled the previous two books, I wanted to maintain the
theme of movie monsters. But as I thought about naming this one, I had a hard time. *The Bride of the Monsters of Education Technology* wouldn’t work, although there are a lot of folks deeply wedded to ed-tech. *The Night of the Monsters of Education Technology* implied there’d be a dawn. I didn’t want to frame my work as a King Kong vs Godzilla type of battle. I tried to think beyond the monster genre to movies with four (or more) sequels. *Monsters of Education Technology: Fury Road* might have worked – there’s the appeal of making an analogy to the dystopia. There’s resonance in the question “Who killed the world?” I toyed with a nod to *Star Wars*, but *Monsters of Education Technology, Episode IV: A New Hope* would not work at all (although I’ll keep it in mind for next year: *Episode V: The Empire Strikes Back*). The fourth *Teenage Mutant Ninja Turtles* movie opted for the abbreviation TMNT; but TMOET reads a bit too close to the name of the champagne, and it’s hardly time for celebration.

We live in a time of monsters.

So, like *Scream 4* and *Halloween 4*, this book is simply *The Monsters of Education Technology 4*. I’m not going to pretend like this series has the weight or majesty that Roman numerals in the title implies. It’s a self-published series, after all.

But I believe that monsters – alone or in sequels -- are serious threats nonetheless.

And here we are, ten months or so into the Trump presidency. I wrote the introduction to *The Curse of the Monsters of Education Technology* on the heels of his election. 2016 was terrible; 2017 has been worse. Democracy feels like it’s waning; we’re on the cusp -- if you take Trump’s Twitter tantrums seriously -- of nuclear war; Betsy DeVos, a right-wing billionaire, runs the Department of Education; Trump’s oldest daughter, Ivanka, says she’s making ed-tech a priority of her work in her father’s administration. The monsters are calling from inside the (white) house.

I traveled a little less this year, but I delivered roughly the same number of talks, thanks in part to a week-long stint as a
visiting fellow at Coventry University. Currently, I’m a Spencer Education Fellow at Columbia University, and I’ve declared that I’m taking a hiatus from the speaking circuit for the duration. We’ll see if there’s enough material for a fifth book in this series. But that’s a year from now. Who knows what the monsters will bring. In the meantime, try to enjoy this one.
I. EDUCATION TECHNOLOGY IN A TIME OF TRUMP
Thank you very much for inviting me to speak here at the University of Richmond – particularly to Ryan Brazell for recognizing my work and the urgency of the conversations that hopefully my visit here will stimulate.

Hopefully. Funny word that – “hope.” Funny, those four letters used so iconically to describe a Presidential campaign from a young Illinois Senator, a campaign that seems now lifetimes ago. Hope.

My talks – and I guess I’ll warn you in advance if you aren’t familiar with my work – are not known for being full of hope. Or rather I’ve never believed the hype that we should put all our faith in, rest all our hope on technology. But I’ve never been hopeless. I’ve never believed humans are powerless. I’ve never believed we could not act or we could not do better.

There were a couple of days, following our decision about the title and topic of this keynote – “Ed-Tech in a Time of Trump” – when I wondered if we’d even see a Trump presidency. Would some revelation about his business dealings, his relationship with Russia, his disdain for the Constitution prevent his inauguration? Should we have been so lucky, I suppose. Hope.
The thing is, I’d still be giving the much the same talk, just with a different title. “A Time of Trump” could be “A Time of Neoliberalism” or “A Time of Libertarianism” or “A Time of Algorithmic Discrimination” or “A Time of Economic Precarity.” All of this – from President Trump to the so-called “new economy” – has been fueled to some extent by digital technologies; and that fuel, despite what I think many who work in and around education technology have long believed, have long hoped – is not necessarily (heck, even remotely) progressive.

I’ve had a sinking feeling in my stomach about the future of education technology long before Americans – 26% of them, at least – selected Donald Trump as our next President. I am, after all, “ed-tech’s Cassandra.” But President Trump has brought to the forefront many of the concerns I’ve tried to share about the politics and the practices of digital technologies. I want to state here at the outset of this talk: we should be thinking about these things no matter who is in the White House, no matter who runs the Department of Education (no matter whether we have a federal department of education or not). We should be thinking about these things no matter who heads our universities. We should be asking – always and again and again: just what sort of future is this technological future of education that we are told we must embrace?

Of course, the future of education is always tied to its past, to the history of education. The future of technology is inexorably tied to its own history as well. This means that despite all the rhetoric about “disruption” and “innovation,” what we find in technology is a layering onto older ideas and practices and models and systems. The networks of canals, for example, were built along rivers. Railroads followed the canals. The telegraph followed the railroad. The telephone, the telegraph. The Internet, the telephone and the television. The Internet is largely built upon a technological infrastructure first mapped and built for freight. It’s no surprise the Internet views us as objects, as products, our personal data as a commodity.

When I use the word “technology,” I draw from the work of
physicist Ursula Franklin who spoke of technology as a practice: “Technology is not the sum of the artifacts, of the wheels and gears, of the rails and electronic transmitters,” she wrote. “Technology is a system. It entails far more than its individual material components. Technology involves organization, procedures, symbols, new words, equations, and, most of all, a mindset.” “Technology also needs to be examined as an agent of power and control,” Franklin insisted, and her work highlighted “how much modern technology drew from the prepared soil of the structures of traditional institutions, such as the church and the military.”

I’m going to largely sidestep a discussion of the church today, although I think there’s plenty we could say about faith and ritual and obeisance and technological evangelism. That’s a topic for another keynote perhaps. And I won’t dwell too much on the military either – how military industrial complexes point us towards technological industrial complexes (and to ed-tech industrial complexes in turn). But computing technologies undeniably carry with them the legacy of their military origins. Command. Control. Communication. Intelligence.

As Donna Haraway argues in her famous “Cyborg Manifesto,” “Feminist cyborg stories have the task of recoding communication and intelligence to subvert command and control.” I want those of us working in and with education technologies to ask if that is the task we’ve actually undertaken. Are our technologies or our stories about technologies feminist? If so, when? If so, how? Do our technologies or our stories work in the interest of justice and equity? Or, rather, have we adopted technologies for teaching and learning that are much more aligned with that military mission of command and control? The mission of the military. The mission of the church. The mission of the university.

I do think that some might hear Haraway’s framing – a call to “recode communication and intelligence” – and insist that that’s exactly what education technologies do and they do so in a progressive reshaping of traditional education institutions and practices. Education technologies facilitate
communication, expanding learning networks beyond the classroom. And they boost intelligence – namely, how knowledge is created and shared.

Perhaps they do.

But do our ed-tech practices ever actually recode or subvert command and control? Do (or how do) our digital communication practices differ from those designed by the military? And most importantly, I’d say, does (or how does) our notion of intelligence?

“Intelligence” – this is the one to watch and listen for. (Yes, that’s ironic that “ed-tech in a time of Trump” will be all about intelligence, but hear me out.)

“Intelligence” means understanding, intellectual, mental faculty. Testing intelligence, as Stephen Jay Gould and others have argued, has a long history of ranking and racism. The word “intelligence” is also used, of course, to describe the gathering and assessment of tactical information – information, often confidential information, with political or military value. The history of computing emerges from cryptography, tracking and cracking state secrets. And the word “intelligence” is now used – oh so casually – to describe so-called “thinking machines”: algorithms, robots, AI.

It’s probably obvious – particularly when we think of the latter – that our notions of “intelligence” are deeply intertwined with technologies. “Computers will make us smarter.” You know those assertions. But we’ve long used machines to measure and assess “intelligence” and to monitor and surveil for the sake of “intelligence.” And again, let’s recall Franklin’s definition of technologies includes not just hardware or software, but ideas, practices, models, and systems.

One of the “hot new trends” in education technology is “learning analytics” – this idea that if you collect enough data about students that you can analyze it and in turn algorithmically direct students towards more efficient and productive behaviors, direct institutions towards more efficient and productive outcomes. Command. Control. Intelligence.
And I confess, it’s that phrase “collect enough data about students” that has me gravely concerned about “ed-tech in a time of Trump.” I’m concerned, in no small part, because students are often unaware of the amount of data that schools and the software companies they contract with know about them. I’m concerned because students are compelled to use software in educational settings. You can’t opt out of the learning management system. You can’t opt out of the student information system. You can’t opt out of required digital textbooks or digital assignments or digital assessments. You can’t opt out of the billing system or the financial aid system. You can’t opt out of having your cafeteria purchases, Internet usage, dorm room access, fitness center habits tracked. Your data as a student is scattered across multiple applications and multiple databases, most of which I’d wager are not owned or managed by the school itself but rather outsourced to a third-party provider.

School software (and I’m including K–12 software here alongside higher ed) knows your name, your birth date, your mailing address, your home address, your race or ethnicity, your gender (I should note that many education technologies still require “male” or “female” and do not allow for alternate gender expressions). It knows your marital status. It knows your student identification number (it might know your Social Security Number too). It has a photo of you, so it knows your face. It knows the town and state in which you were born. Your immigration status. Your first language and whether or not that first language is English. It knows your parents’ language at home. It knows your income status – that is, at the K–12 level, if you qualify for a free or reduced lunch and at the higher ed level, if you qualify for a Pell Grant. It knows if you are the member of a military family. It knows if you have any special education needs. It knows if you were identified as “gifted and talented.” It knows if you graduated high school or passed a high school equivalency exam. It knows your attendance history – how often you miss class as well as which schools you’ve previously attended. It knows your behavioral history. It knows your criminal history. It knows your participation in sports or other extracurricular activities. It
knows your grade level. It knows your major. It knows the courses you’ve taken and the grades you’ve earned. It knows your standardized test scores.

Obviously, it’s not a new practice to track much of that data, and as such these practices are not dependent entirely on new technologies. There are various legal and policy mandates that have demanded for some time now that schools collect this information. Now we put it in “the cloud” rather than in a manila folder in a locked file cabinet. Now we outsource this to software vendors, many of whom promise that because of the era of “big data” that we should collect even more information about students – all their clicks and their time spent “on task,” perhaps even their biometric data and their location in real time – so as to glean more and better insights. Insights that the vendors will then sell back to the school.

Big data.

Command. Control. Intelligence.

This is the part of the talk, I reckon, when someone who speaks about the dangers and drawbacks of “big data” turns the focus to information security and privacy. No doubt schools are incredibly vulnerable on the former front. Since 2005, US universities have been the victim of almost 550 data breaches involving nearly 13 million known records. We typically think of these hacks as going after Social Security Numbers or credit card information or something that’s of value on the black market.

The risk isn’t only hacking. It’s also the rather thoughtless practices of information collection, information sharing, and information storage. Many software companies claim that the data that’s in their systems is their data. It’s questionable if much of this data – particularly metadata – is covered by FERPA. As such, student data can be sold and shared, particularly when the contracts signed with a school do not prevent a software company from doing so. Moreover, these contracts often do not specify how long student data can be kept.
In this current political climate – ed-tech in a time of Trump – I think universities need to realize that there’s a lot more at stake than just financially motivated cybercrime. Think WikiLeaks’ role in the Presidential election, for example. Now think about what would happen if the contents of your email account were released to the public. President Trump has made it a little bit easier, perhaps, to come up with “worse case scenarios” when it comes to politically-targeted hacks, and we might be able to imagine these in light of all the data that higher ed institutions have about students (and faculty).

Again, the risk isn’t only hacking. It’s amassing data in the first place. It’s profiling. It’s tracking. It’s surveilling. It’s identifying “students at risk” and students who are “risks.”

Several years ago – actually, it’s been five or six or seven now – when I was first working as a freelance tech journalist, I interviewed an author about a book he’d written on big data and privacy. He made one of those casual remarks that you hear quite often from people who work in computing technologies: privacy is dead. He’d given up on the idea that privacy was possible or perhaps even desirable; what he wanted instead was transparency – that is, to know who has your data, what data, what they do with it, who they share it with, how long they keep it, and so on. You can’t really protect your data from being “out there,” he argued, but you should be able to keep an eye on where “out there” it exists and what “out there” it’s being used for.

This particular author reminded me that we’ve counted and tracked and profiled people for decades and decades and decades and decades. In some ways, that’s the project of the Census – first conducted in the United States in 1790. It’s certainly the project of much of the data collection that happens at school. And we’ve undertaken these practices since well before there was “big data” or computers to collect and crunch it. Then he made a comment that, even at the time, I found deeply upsetting. “Just as long as we don’t see a return of Nazism,” he joked, “we’ll be okay. Because it’s pretty easy to know if you’re a Jew. You don’t have to tell Facebook. Facebook knows.”
We can substitute other identities there. It’s easy to know if you’re Muslim. It’s easy to know if you’re queer. It’s easy to know if you’re pregnant. It’s easy to know if you’re Black or Latino or if your parents are Syrian or French. It’s easy to know your political affinities. And you needn’t have given over that data, you needn’t have “checked those boxes” in your student information system in order for the software to develop a fairly sophisticated profile about you.

This is a punch card, a paper-based method of proto-programming, one of the earliest ways in which machines could be automated. It’s a relic, a piece of “old tech,” if you will, but it’s also a political symbol. Think draft cards. Think the slogan “Do not fold, spindle or mutilate.” Think Mario Savio on the steps of Sproul Hall at UC Berkeley in 1964, insisting angrily that students not be viewed as raw materials in the university machine.

The first punch cards were developed to control the loom, industrializing the craft of weaving women around 1725. The earliest design – a paper tape with holes punched in it – was improved upon until the turn of the 19th century, when Joseph Marie Jacquard first demonstrated a mechanism to automate
Jacquard’s invention inspired Charles Babbage, often credited with originating the idea of a programmable computer. A mathematician, Babbage believed that “number cards,” “pierced with certain holes,” could operate the Analytical Engine, his plans for a computational device. “We may say most aptly that the Analytical Engine weaves algebraical patterns just as the Jacquard-loom weaves flowers and leaves,” Ada Lovelace, Babbage’s translator and the first computer programmer, wrote.

But it was Herman Hollerith who invented the recording of data on this medium so that it could then be read by a machine. Earlier punch cards – like those designed by Jacquard – were used to control the machine. They weren’t used to store data. But Hollerith did just that. The first Hollerith card had 12 rows and 9 columns, and data was recorded by the presence or absence of a hole at a specific location on a card.

Hollerith founded The Tabulating Machine Company in 1896, one of four companies consolidated to form Computing-Tabulating-Recording Company, later renamed the International Business Machines Corporation. IBM.

Hollerith’s punch card technology was first used in the US Census in 1890 to record individual’s traits – their gender, race, nationality, occupation, age, marital status. These cards could then be efficiently sorted to quantify the nation. The Census was thrilled as it had taken almost a decade to tabulate the results of the 1880 census, and by using the new technology, the agency saved $5 million.

Hollerith’s machines were also used by Nicholas II, the czar of Russia for the first (and only) census of the Russian Imperial Empire in 1897. And they were adopted by Hitler’s regime in Germany. As Edwin Black chronicles in his book *IBM and the Holocaust*,

When Hitler came to power, a central Nazi goal was to identify and destroy Germany’s 600,000-member Jewish
community. To Nazis, Jews were not just those who practiced Judaism, but those of Jewish blood, regardless of their assimilation, intermarriage, religious activity, or even conversion to Christianity. Only after Jews were identified could they be targeted for asset confiscation, ghettoization, deportation, and ultimately extermination. To search generations of communal, church, and governmental records all across Germany – and later throughout Europe – was a cross-indexing task so monumental, it called for a computer. But in 1933, no computer existed.

What did exist at the time was the punch card and the IBM machine, sold to the Nazi government by the company’s German subsidiary, Dehomag.

Hitler’s regime made it clear from the outset that it was not interested in merely identifying those Jews who claimed religious affiliation, who said that they were Jewish. It wanted to be able to find those who had Jewish ancestry, Jewish “blood,” those who were not Aryan.

Hitler called for a census in 1933, and Germans filled out the census on pen and paper – one form per household. There was a census again in 1939, and as the Third Reich expanded, so did the Nazi compulsion for data collection. Census forms were coded and punched by hand and then sorted and counted by machine. IBM punch cards and IBM machines. During its relationship with the Nazi regime – one lasting throughout Hitler’s rule, throughout World War II – IBM derived about a third of its profits from selling punch cards.

Column 22 on the punch card was for religion – punched at hole 1 to indicate Protestant, hole 2 for Catholic, hole 3 for Jew. The Jewish cards were processed separately. The cards were sorted and indexed and filtered by profession, national origin, address, and other traits. The information was correlated with other data – community lists, land registers, medical information – in order to create a database, “a profession-by-profession, city-by-city, and indeed a block-by-block revelation of the Jewish presence.”

It was a database of inference, relying heavily on statistics.
alongside those IBM machines. This wasn’t just about those who’d “ticked the box” that they were Jewish. Nazi “race science” believed it could identify Jews by collecting and analyzing as much data as possible about the population. “The solution is that every interesting feature of a statistical nature … can be summarized … by one basic factor,” the Reich Statistical Office boasted. “This basic factor is the Hollerith punch card.”

Command. Control. Intelligence.

The punch card and the mechanized processing of its data were used to identify Jews, as well as Roma and other “undesirables” so they could be imprisoned, so their businesses and homes could be confiscated, so their possessions could be inventoried and sold. The punch card and the mechanized processing of its data was used to determine which “undesirables” should be sterilized, to track the shipment of prisoners to the death camps, and to keep tabs on those imprisoned and sentenced to die therein. All of this recorded on IBM punch cards. IBM machines.

The CEO of IBM at this time, by the way: Thomas Watson. Yes, this is who IBM has named their “artificial intelligence” product Watson after. IBM Watson, which has partnered with Pearson and with Sesame Street, to “personalize learning” through data collection and data analytics.

Now a quick aside, since I’ve mentioned Nazis.

Back in 1990, in the early days of the commercialized Internet, those heady days of Usenet newsgroup discussion boards, attorney Mike Godwin “set out on a project in memetic engineering.” Godwin felt as though comparisons to Nazis occurred too frequently in online discussions. He believed that accusations that someone or some idea was “Hitler-like” were thrown about too carelessly. “Godwin’s Law,” as it came to be known, says that “As an online discussion grows longer, the probability of a comparison involving Hitler approaches 1.” Godwin’s Law has since been invoked to decree that once someone mentions Hitler or Nazis, that person has lost the debate altogether. Pointing out Nazism online is off-limits.
Perhaps we can start to see now how dangerous, how damaging to critical discourse this even rather casual edict has been.

Let us remember the words of Supreme Court Justice Robert Jackson in his opening statement for the prosecution at the Nuremberg Trials:

> What makes this inquest significant is that these prisoners represent sinister influences that will lurk in the world long after their bodies have returned to dust. We will show them to be living symbols of racial hatreds, of terrorism and violence, and of the arrogance and cruelty of power. … Civilization can afford no compromise with the social forces which would gain renewed strength if we deal ambiguously or indecisively with the men in whom those forces now precariously survive.

We need to identify and we need to confront the ideas and the practices that are the lingering legacies of Nazism and fascism. We need to identify and we need to confront them in our technologies. Yes, in our education technologies. Remember: our technologies are ideas; they are practices. Now is the time for an ed-tech antifa, and I cannot believe I have to say that out loud to you.

And so you hear a lot of folks in recent months say “read Hannah Arendt.” And I don’t disagree. Read Arendt. Read *The Origins of Totalitarianism*. Read her reporting from the Nuremberg Trials.

But also read James Baldwin. Also realize that this politics and practice of surveillance and genocide isn’t just something we can pin on Nazi Germany. It’s actually deeply embedded in the American experience. It is part of this country *as a technology*.

Let’s think about that first US census, back in 1790, when federal marshals asked for the name of each head of household as well as the numbers of household members who were free white males over age 16, free white males under 16, free white
females, other free persons, and slaves. In 1820, the categories were free white males, free white female, free colored males and females, and slaves. In 1850, the categories were white, Black, Mulatto, Black slaves, Mulatto slaves. In 1860, white, Black, Mulatto, Black slaves, Mulatto slaves, Indian. In 1870, white, Black, Mulatto, Indian, Chinese. In 1890, white, Black, Mulatto, Quadroon, Octoroon, Indian, Chinese, Japanese. In 1930, white, Negro, Indian, Chinese, Japanese, Filipino, Korean, Hindu, Mexican.

You might see in these changing categories a changing demographic; or you might see this as the construction and institutionalization of categories of race – particularly race set apart from a whiteness of unspecified national origin, particularly race that the governing ideology and governing system wants identified and wants managed. The construction of Blackness. “Census enumeration is a means through which a state manages its residents by way of formalized categories that fix individuals within a certain time and a particular space,” as Simone Browne writes in her book Dark Matters: On the Surveillance of Blackness, “making the census a technology that renders a population legible in racializing as well as gendering ways.” It is “a technology of disciplinary power that classifies, examines, and quantifies populations.”

Command. Control. Intelligence.

Does the data collection and data analysis undertaken by schools work in a similar way? How does the data collection and data analysis undertaken by schools work? What bodies and beliefs are constituted therein? Is whiteness and maleness always there as “the norm” against which all others are compared? Are we then constructing and even naturalizing certain bodies and certain minds as “undesirable” bodies and “undesirable” minds in the classroom, in our institutions by our obsession with data, by our obsession with counting, tracking, and profiling?

Who are the “undesirables” of ed-tech software and education institutions? Those students who are identified as “cheats,” perhaps. When we turn the cameras on, for example with
proctoring software, those students whose faces and gestures are viewed – visually, biometrically, algorithmically – as “suspicious.” Those students who are identified as “out of place.” Not in the right major. Not in the right class. Not in the right school. Not in the right country. Those students who are identified – through surveillance and through algorithms – as “at risk.” At risk of failure. At risk of dropping out. At risk of not repaying their student loans. At risk of becoming “radicalized.” At risk of radicalizing others. What about those educators at risk of radicalizing others. Let’s be honest with ourselves, ed-tech in a time of Trump will undermine educators as well as students; it will undermine academic freedom. It’s already happening. Trump’s tweets this morning about Berkeley.

What do schools do with the capabilities of ed-tech as surveillance technology now in the time of a Trump? The proctoring software and learning analytics software and “student success” platforms all market themselves to schools claiming that they can truly “see” what students are up to, that they can predict what students will become. (“How will this student affect our averages?”) These technologies claim they can identify a “problem” student, and the implication, I think, is that then someone at the institution “fixes” her or him. Helps the student graduate. Convinces the student to leave.

But these technologies do not see students. And sadly, we do not see students. This is cultural. This is institutional. We do not see who is struggling. And let’s ask why we think, as the New York Times argued today, we need big data to make sure students graduate. Universities have not developed or maintained practices of compassion. Practices are technologies; technologies are practices. We’ve chosen computers instead of care. (When I say “we” here I mean institutions not individuals within institutions. But I mean some individuals too.) Education has chosen “command, control, intelligence.” Education gathers data about students. It quantifies students. It has adopted a racialized and gendered surveillance system – one that committed to disciplining minds and bodies – through our education technologies,
through our education practices.

All along the way, or perhaps somewhere along the way, we have confused surveillance for care.

And that’s my takeaway for folks here today: when you work for a company or an institution that collects or trades data, you’re making it easy to surveil people and the stakes are high. They’re always high for the most vulnerable among us. By collecting so much data, you’re making it easy to discipline people. You’re making it easy to control people. You’re putting people at risk. You’re putting students at risk.

You can delete the data. You can limit its collection. You can restrict who sees it. You can inform students. You can encourage students to resist. Students have always resisted school surveillance.

But I hope that you also think about the culture of school. What sort of institutions will we have in a time of Trump? Ones that value open inquiry and academic freedom? I swear to you this: more data will not protect you. Not in this world of “alternate facts,” to be sure. Our relationships to one another, however, just might. We must rebuild institutions that value humans’ minds and lives and integrity and safety. And that means, in its current incarnation at least, in this current climate, ed-tech has very, very little to offer us.
This was what I said at a panel on 20 April 2017, at the University of Mary Washington as part of its Presidential Inauguration Week. The panel was titled "Higher Education in the Disinformation Age: Can America's public liberal arts universities restore critical thinking and civility in public discourse?" The other panelists included Steve Farnsworth (University of Mary Washington), Sara Cobb (George Mason University), and Julian Hayter (University of Richmond). I only had ten minutes, so I recognize my remarks really only scratch the surface.
In February 2014, I happened to catch a couple of venture capitalists complaining about journalism on Twitter. (Honestly, you could probably pick any month or year and find the same.) “When you know about a situation, you often realize journalists don’t know that much,” one tweeted. “When you don’t know anything, you assume they’re right.” Another VC responded, “there’s a name for this and I think Murray Gell-Mann came up with it but I’m sick today and too lazy to search for it.” A journalist helpfully weighed in: “Michael Crichton called it the Murray Gell-Mann Amnesia Effect,” providing a link to a blog with an excerpt in which Crichton explains the concept.

Apologies for quoting Crichton at length:

Media carries with it a credibility that is totally undeserved. You have all experienced this, in what I call the Murray Gell-Mann Amnesia effect. (I call it by this name because I once discussed it with Murray Gell-Mann, and by dropping a famous name I imply greater importance to myself, and to the effect, than it would otherwise have.)
Briefly stated, the Gell-Mann Amnesia effect works as follows. You open the newspaper to an article on some subject you know well. In Murray’s case, physics. In mine, show business. You read the article and see the journalist has absolutely no understanding of either the facts or the issues. Often, the article is so wrong it actually presents the story backward-reversing cause and effect. I call these the “wet streets cause rain” stories. Paper’s full of them.

In any case, you read with exasperation or amusement the multiple errors in a story – and then turn the page to national or international affairs, and read with renewed interest as if the rest of the newspaper was somehow more accurate about far-off Palestine than it was about the story you just read. You turn the page, and forget what you know.

That is the Gell-Mann Amnesia effect. I’d point out it does not operate in other arenas of life. In ordinary life, if somebody consistently exaggerates or lies to you, you soon discount everything they say. In court, there is the legal doctrine of falsus in uno, falsus in omnibus, which means untruthful in one part, untruthful in all.

But when it comes to the media, we believe against evidence that it is probably worth our time to read other parts of the paper. When, in fact, it almost certainly isn’t. The only possible explanation for our behavior is amnesia.

I remember, at the time, appreciating parts of this observation. Or at least, I too have often felt frustrated with the reporting I read on education and technology – topics I like to think I know something about. But I hope we can see how these assertions that we shouldn’t read and shouldn’t trust newspapers are dangerous – or at the very least, how these assertions might have contributed to our current misinformation “crisis.” And I’d add too – and perhaps this can be part of our discussion – that how we’ve typically
thought about or taught “information literacy” or “media literacy” has seemingly done little to help us out of this mess.

This isn’t just about Michael Crichton’s dismissal of journalism (and I’ll get to why he’s such a problematic figure here in a minute.) It’s the President. “Forget the press,” Trump said during the campaign. “Read the Internet.” It’s the digital technology industry – including those venture capitalists in my opening anecdote – which has invested in narratives and literally invested in products designed to “disrupt” if not destroy “traditional media.” Facebook. Twitter. Automattic, the developer of the blogging software WordPress. Despite the promises that these sorts of tools would “democratize” information, that the “blogosphere” and later social media would provide an important corrective to the failures of “mainstream journalism,” we find ourselves instead in a world in which institutions and experts are no longer trustworthy.

And yet, all sorts of dis- and misinformation – on the Internet and (to be fair) on TV – is believed. And it’s believed in part because it’s not in print and not from experts or academics or certain journalists.

I wanted to share this Michael Crichton story for a number of reasons. As I was preparing my remarks, I faced a couple of challenges. First, I couldn’t remember where or when I’d seen these tweets, although I was certain I’d first heard about the Gell-Mann Amnesia Effect from venture capitalists on Twitter. Searching for old tweets – verifying Twitter itself as a source – is not easy. Twitter’s search function offers us to “See what’s happening right now.” The architecture of the platform is not designed as a historical record or source.

I guess these tweets were the conversation I saw – I spent a lot of time looking through old VC tweets from 2013 and 2014 – although my memory tells me it was Tim O’Reilly, a different venture capitalist, who’d mentioned the Gell-Mann Amnesia Effect and had caught my eye.

When and if you do find an old tweet you’re looking for – as a scholar, perhaps, or as a journalist – it is stripped from its context within the Twitter timeline, within the user’s stream of
tweets. What was happening on February 28, 2014 that prompted venture capitalist Dave Pell to complain about journalism? I couldn’t really divine.

In this exchange, we have a series of other Internet-based information claims. Journalist Mathew Ingram links to a blog post to explain the Gell-Mann Amnesia Effect, but if you click, you’ll find all of the links in that particular post are dead, including the one that goes to “The Official Site of Michael Crichton.”

If you google “Gell-Mann Amnesia Effect,” the top search result is Goodreads, a book review site owned by Amazon. The excerpt there doesn’t give a date or a source or a link to Crichton’s commentary.
The Internet doesn’t magically surface “the truth.” Its infrastructure can quite readily obscure things. You have to understand how to look for information online, and you have to have some domain expertise (or know someone with domain expertise) so you can actually verify things.

The “Gell-Mann Amnesia Effect” comes from a talk titled “Why Speculate?” that Crichton gave in 2002 at the International Leadership Forum, a think tank run by the now-dormant Western Behavioral Sciences Institute. You can google this stuff, of course. Or maybe you know it. Maybe this is all, to borrow from Crichton “some subject you know well.”

Maybe you’re familiar with Crichton too, or more likely you’ve heard his name – a best-selling author; medically trained, but never formally licensed to practice medicine; creator of the TV show ER; writer and director of the movie Westworld (the one with Yul Brenner); and author of many novels including Jurassic Park, The Andromedia Strain, Disclosure, and State of Fear. After the publication of Disclosure, Crichton was accused of being anti-feminist; after the publication of State of Fear, he sealed his status as one of
And this is all part of the message of that talk in which he argues for the existence of the Gell-Mann Amnesia Effect. Journalism, Crichton contends, is almost entirely speculation. Sunday talk shows, speculation. Global climate change, speculation. “False fears.” Crichton blames the end of fact-checking on the praise for Susan Faludi’s feminist book Backlash. He blames academia, particularly post-modernism: “most areas of intellectual life have discovered the virtues of speculation. In academia, speculation is usually dignified as theory.”

This was 2002 – Crichton doesn’t blame the Internet. He doesn’t blame the Web. He doesn’t blame Facebook. He blames MSNBC. He blames The New York Times.

2002 – A year before Judith Miller’s now discredited reporting on the weapons of mass destruction in Iraq appeared in that very newspaper.
In the past 15 years, I wonder if that the “amnesia effect” has worn off in some troubling rather than liberatory ways. Increasingly we trust very little that the media says. Last year, Gallup found Americans’ trust in the media had dropped to the lowest level in polling history. The media, as Crichton and others contend, is all speculation. “Fake news.”

But it’s not just the media. We face a crisis in all our information institutions – journalism and higher education, in particular. Expertise is now utterly suspect. We mistrust (print) journalists – “the mainstream media,” whatever that means; we mistrust academics; we mistrust scientists.

We still trust some stories sometimes. Importantly, we trust what confirms our pre-existing beliefs. Perhaps we can call this the Michael Crichton Ego Effect. We have designated ourselves as experts-of-sorts whenever we confront the news. We know better than journalists, because of course we do. (This effect applies most readily to men.)

The Internet has made it particularly easy for us to confirm our beliefs and our so-called expertise. Digital technologists (and venture capitalists) promised this would be a good thing for knowledge-building; it appears, instead, to be incredibly destructive. And that's the challenge for journalism, sure. It's the challenge for universities. It's the challenge for democracy.
3 EDUCATION TECHNOLOGY AS “THE NEW NORMAL”

This talk was given at CENTRO’s symposium "Data, Paper, Scissors Tech-Based Learning Experiences for Higher Education" in Mexico City on 24 May 2017

History is not the past. It is the present. We carry our history with us. We are our history. If we pretend otherwise, we literally are criminals.

I attest to this: the world is not white; it never was white, cannot be white. White is a metaphor for power, and that is simply a way of describing Chase Manhattan Bank.

– James Baldwin

Thank you very much for inviting me here today. I must apologize in advance for a couple of things about this presentation. First, I apologize that it’s in English. Second, I apologize that it takes such a grim tone. I’m well known, I think, for fierce criticisms and cautions about education technology, and what I’ve prepared today is perhaps even darker and more polemical than I’d like, strikingly so on this beautiful campus. I confess: I am feeling incredibly concerned about the direction the world is taking – politically, environmentally, economically, intellectually, institutionally, technologically. Trump. Digital technologies, even education
technologies, are implicated in all of this, and if we are not careful, we are going to make things worse.

I want to be sure that anytime we talk about “the future of education,” that we always consider “the history of education.” We cannot break from history. We have not severed ourselves from the past through the introduction of computers or computer networks. Our institutions have not been severed from the past because of these technologies. Our cultures have not. (At least not entirely.)

When we talk about “the future of education” as an explicitly technological future, I want us to remember that “the history of education” has long been technological – thousands of years of writing, hundreds of years of print, a century of “teaching machines,” 75 years of computing, almost 60 years of computer-assisted instruction, at least 40 years of the learning management system, more than 25 years of one-to-one laptop programs, a decade (give or take a year) of mobile learning. Education technology is not new; it has not appeared “all of a sudden”; and it is not a rupture. It is inextricably linked to history, to histories of education, and to histories of technology.

Education technology has its roots in traditional institutions, including and particularly the university and the military.

To be clear, when I talk about education technology or technologies, I am not referring simply to tools or artifacts or products; and technologies certainly aren’t simply computing devices – software or hardware. Technologies, to borrow from the physicist Ursula Franklin, are practices. Technologies are systems. Technology “entails far more than its individual material components,” Franklin wrote. “Technology involves organizations, procedures, symbols, new words, equations, and, most of all, a mindset.”

When I say that education technology is not new, I’m not arguing that technologies do not change over time; or that our institutions, ideas, experiences, societies do not change in part because of technologies. But when we talk about change – when we tell stories about technological change – we must
consider how technologies, particularly modern technologies like computers, emerged from a certain history, from certain institutions; how technologies are as likely to re-inscribe traditional practices as to alter them. We must consider how technology operates, in Franklin’s words, as “an agent of power and control.” We must consider how technologies carry this in their design, in their code, in their materiality, in their usage, in the ideologies that underpin them. Because of industry and because of institutions and because of capitalism and because of the weight of history and tradition, technologies are often hegemonic, even if, from time-to-time, we can seize them for counter-hegemonic stories and practices.

All this is particularly important, I would argue, when we think about the technologies – practices, beliefs, systems – that are developed by or developed for educational institutions, when we think about education technologies and when we think about educational change.

There are compelling stories, no doubt, about education technology. We’ll hear them today. Old stories and new stories. Education technology as disruptive. Education technology as transformative. Education technology as progressive (“progressive” as in progressive education like that envisioned by Maria Montessori or John Dewey; or “progressive” as related to social reform movements; or “progressive” as relating to technological progress). In the twenty-first century (as it has been for some time now) we are quite taken with the notion of technology as the force for “progress,” for change. But let’s not confuse new products and new practices and new politics with better.

If technology is the force for change, in this framework, those who do not use technology, of course – schools and teachers, stereotypically – are viewed as resistant to or even obstacles to change.

Seymour Papert, an early promoter of the narrative that personal computers would transform learning, wrote in 1993 that he’d already seen the ways in which educational
institutions had dulled computers’ radical potential. “Little by little the subversive features of the computer were eroded away,” he wrote in his book *The Children’s Machine*.

Instead of cutting across and so challenging the very idea of subject boundaries, the computer now defined a new subject; instead of changing the emphasis from impersonal curriculum to excited live exploration by students, the computer was now used to reinforce School’s ways. What had started as a subversive instrument of change was neutralized by the system and converted into an instrument of consolidation.

It’s been almost 25 years since Papert wrote that book, and we can debate whether or not computers have actually failed to change educational institutions. (Certainly the title of this segment of today’s event – “the new normal” – seems to conclude that something in School’s ways, to borrow Papert’s phrase, has shifted.) We can debate too whether or not computers were ever really a “subversive instrument of change” in education. Or rather, what exactly *do* computers subvert? (Institutions? People? The public?)

And this is the question, I think, that feels incredibly pertinent for us to consider, particularly as the education technology industry boasts about its disruptive capabilities and exerts its financial, political, and cultural power. What might be subverted? What might be lost? (That is, *who will lose*?)

When I hear the phrase “the new normal,” I cannot help but think of the ways in which those same words were used in the US to describe the economy during and since the financial crisis of 2007–2008 and subsequent global recession. A period of slow economic growth, limited job creation, and stagnant incomes. A period of economic instability for most of us, and one of growing economic inequality globally as the super wealthy got super wealthier.

That period was also one of enormous growth in new digital technology companies. Facebook and Twitter grew in popularity as social networks emerged to profoundly reconfigure information and media. Netflix moved from
DVDs to a streaming service to a media company in its own right. Amazon introduced “The Cloud.” Apple introduced the iPhone, and “apps” became ubiquitous, leading some to pronounce the World Wide Web – a scholarly endeavor at its origin, let’s not forget – was dead. Venture capitalists became exuberant once again about investing in high tech startups, even those in education, which had for the previous decade been seen as a difficult and unprofitable market. Another Dot Com boom was predicted, this one centered on personal data.

But the growth of Silicon Valley didn’t really do much to improve the economic well-being of most of us. It didn’t really create jobs, although it did create wealth for a handful of investors and entrepreneurs. It did help further a narrative that our economic precarity was not only “the new normal” but potentially liberatory. The “freelance” economy, we were told, meant we didn’t have to have full-time employment any longer. Just “gigs.” The anti-regulatory practices and libertarian ideology espoused by the CEO of Uber became a model for talking about this “new economy” – that is until Uber (and others) are able to replace freelance workers with robots, of course. “We’re like Uber,” became something other companies, including those in education, would boast, despite Uber’s skullduggery.

This “new normal” does not simply argue that governmental regulations impede innovation. It posits government itself as an obstacle to change. It embraces libertarianism; it embraces “free markets.” It embraces a neoliberalism that calls for shrinking budgets for public services, including education – a shifting of dollars to private industry.

Education needs to change, we have long been told. It is outmoded. Inefficient. And this “new normal” – in an economic sense much more than a pedagogical one – has meant schools have been tasked to “do more with less” and specifically to do more with new technologies which promise greater efficiency, carrying with them the values of business and markets rather than the values of democracy or democratic education.
These new technologies, oriented towards consumers and consumption, privilege an ideology of individualism. In education technology, as in advertising, this is labeled “personalization.” The flaw of traditional education systems, we are told, is that they focus too much on the group, the class, the collective. So, we see education being reframed as a technologically-enhanced series of choices – *consumer* choices. Technologies monitor and extract data in order to maximize “engagement” and entertainment.

I fear that new normal, what it might really mean for teaching, for learning, for scholarship.

Seymour Papert argued that “School’s ways” would persist, despite the subversiveness of computers, but I’m not so sure. Or rather, I’d argue that we do see a subversiveness from computers – let’s call it an Uberification – but it looks nothing like what he had hoped for. If School’s ways have been altered, it’s because of the political and fiscal pressures on them. I’d argue new technologies are prompting schools to acquiesce to, to merge with “Silicon Valley’s ways.” With surveillance capitalism, for example.

Technologies may well be poised to redefine how we think about learning, intelligence, inquiry, the learner, the teacher, teaching, knowledge, scholarship. But remember: technological “progress” does not necessarily mean “progressive politics.” Silicon Valley’s ways also include individualism, neoliberalism, libertarianism, imperialism, the exclusion of people of color and white women from its workforce. These biases are now part of algorithms and algorithmic decision-making.

Again, my fear with our being comfortable or complacent with this “new normal”: Silicon Valley’s ways and Silicon Valley’s technologies are readily subverting the values of democracy and justice.

The values of democracy and justice should be School’s ways. But to be fair, neither democracy nor justice are values that most educational institutions (historically, presently) have truly or fully or consistently lauded or oriented themselves
around.

If we want the future to be something other than an exploitative dystopia, I think our task must be to resist the narratives and the practices and the technologies that further inequality.

We cannot do this through technological solutionism (although technologies are absolutely part of what we need to address and fundamentally rethink). We need to rethink our practices. We have to forgo “personalization.” We must do this through collective action, through community. We do this through action oriented around social and racial justice. We do this through democracy. (And through art.)

If educational institutions cannot take leadership in this crisis – a crisis of “the new normal” – then I don’t think we have any hope at all. My hope right now rests in the leadership of those outside Silicon Valley, indeed outside the US.
4 THE HISTORIES OF PERSONALIZED LEARNING

I delivered this talk at the OEB MidSummit conference in Reykjavik, Iceland on 9 June 2017

I recognize that the theme of this conference is “shaping the future of learning” but I want to talk a little bit about the past. I want us to think about the ways in which the history of
learning – how we tell that story – shapes the future of learning, and how the history of technology (education technology and otherwise) – and how we tell that story – shapes the future of technology. I want us to recognize there is a history even in the face of a fervent insistence that new, digital technologies are poised to sweep away traditional institutions and traditional practices. You know the stories: revolutions and disruptive innovations and other millennialist mythologies: the end of history, the end of work, the end of college, and so on.

You hear a lot of these sorts of proclamations when it comes to “personalized learning,” which is (increasingly) frequently invoked in direct opposition to some imagined or invented version of learning in the present or in the past. Education technologists and futurists (and pundits and politicians) like to provide these thumbnail sketches about what schooling has been like – unchanged for hundreds or thousands of years, some people (who are clearly not education historians) will try to convince you. They do so in order to make a particular point about their vision for what learning should be like. “The factory model of education” – this is the most common one – serves as a rhetorical and political foil against which reforms and technological interventions can be positioned. These sorts of sketches and catchphrases never capture the complex history of educational practices or institutions. (They’re not meant to. They’re slogans, not scholarship.) Nevertheless, these imagined histories are often quite central to the premise that education technology is different and disruptive and new and, above all, necessary.

There is no readily agreed upon meaning of the phrase “personalized learning,” which probably helps its proponents wield these popularized tales about the history of education and then in turn laud it – “personalized learning,” whatever that is – as an exciting, new corrective to the ways they claim education has “traditionally” functioned (and in their estimation, of course, has failed).

“Personalized learning” can mean that students “move at their own pace” through lessons and assignments, for example,
unlike those classrooms where everyone is expected to move through material together. (In an invented history of education, this has been the instructional arrangement for all of history.) Or “personalized learning” can mean that students have a say in what they learn – students determine topics they study and activities they undertake. “Personalized learning,” according to some definitions, is driven by students’ own interests and inquiry rather than by the demands or standards imposed by the instructor, the school, the state. “Personalized learning,” according to other definitions, is driven by students’ varied abilities or needs; it’s a way of navigating the requirements of school bureaucracies and requesting appropriate accommodations – “individualized education plans” and the like. Or “personalized learning” is the latest and greatest – some new endeavor that will be achieved, not through human attention or agency or through paperwork or policy but through computing technologies. That is, through monitoring and feedback, through automated assessment, and through the programmatic presentation of new or next materials to study.

“Personalized learning,” depending on how you define it, dates back to Rousseau. Or it dates back further still – to Alexander the Great’s tutor, some guy named Aristotle. It dates to the nineteenth century. Or to the twentieth century. It dates to the rise of progressive education theorists and practitioners. To John Dewey. Or to Maria Montessori. Or it dates to the rise of educational psychology. To B. F. Skinner. To Benjamin Bloom. It dates to special education-related legislation passed in the 1970s or to the laws passed the 1990s. Or it dates to computer scientist Alan Kay’s 1972 essay “A Personal Computer for Children of All Ages.” Or it dates to the Gates Foundation’s funding grants and political advocacy in the early 2000s. Take your pick. (Take your pick, and reveal your education politics.)

I want to talk to you today about the history of personalized learning – in no small part because it’s taken on such political and financial and rhetorical significance. Andrew Keen alluded to this yesterday in his remarks about the efforts of Silicon Valley’s philanthro-venture-capitalism in shaping the
future of education. Bill Gates and Mark Zuckerberg, for example, are plowing billions of dollars into “personalized learning” products and school reforms. That seems significant – particularly if we don’t understand or agree on what the phrase actually means. (That means, it seems likely, that these billionaires get to decide, not progressive educators.)

So, where did this concept of “personalized learning” originate? Who has propagated it? When? Why? How has the meaning of the phrase changed over time? That’s a lot to do in a 20-minute talk, so I’m going to offer you several histories, origins, and trajectories of “personalization” more broadly – as a cultural not just technological or pedagogical practice.

The OED dates the word “personalization” in print to the 1860s, but the definition that’s commonly used today – “The action of making something personal, or focused on or concerned with a certain individual or individuals; emphasis on or attention to individual persons or personal details” – dates to the turn of the twentieth century, to 1903 to be precise. “Individualization,” according to the OED, is much older; its first appearance in print was in 1746.

The Google Ngram Viewer, which is also based on material in print, suggests the frequency of these two terms’ usage –
“individualization” and “personalization” – looks something like this:

In the late twentieth century, talk of “individualization” gave way to “personalization.” Why did our language shift? What happened circa 1995? (I wonder.)

Now, no doubt, individualism has been a core tenet of the modern era. It’s deeply enmeshed in Western history (and in American culture and identity in particular). I always find myself apologizing at some point that my talks are so deeply US-centric. But I contend you cannot analyze digital technologies and the business and politics of networks and computers without discussing how deeply embedded they are in what I’ve called the “Silicon Valley narrative” and in what others have labeled the “California ideology” – and that’s an ideology that draws heavily on radical individualism and on libertarianism.

It’s also an ideology – this “Silicon Valley narrative” – that is deeply intertwined with capitalism: contemporary capitalism, late-stage capitalism, global capitalism, venture capitalism, surveillance capitalism, whatever you prefer to call it.
Indeed, we can see “personalization” as both a product (and I mean quite literally a product) of and a response to the rise of post-war consumer capitalism. Monograms on mass-produced objects. Millions of towels and t-shirts and trucks and tchotchkes that are all identical except you can buy one with your name or your initials printed on it. Perhaps “personalization” acts as some sort of psychological balm to standardization.

A salve. Not a solution.

But “personalization” is not simply how we cope with our desire for individuality in an age of mass production, of course. It’s increasingly how we’re sold things. It’s how we are profiled, how we are segmented, how we are advertised to.

Here’s Wikipedia’s introduction to its entry on “personalization,” which I offer not because it’s definitive in any way but because it’s such a perfect encapsulation of how Internet culture sees itself, sees its history, tells its story, rationalizes its existence, frames its future:

Personalization, sometimes known as customization, consists of tailoring a service or product to accommodate specific individuals, sometimes tied to groups or segments of individuals. A wide variety of organizations use personalization to improve customer
satisfaction, digital sales conversion, marketing results, branding, and improved website metrics, as well as for advertising.

How much of “personalized learning” as imagined and built and sold by tech companies is precisely this: metrics, marketing, conversion rates, customer satisfaction? (They just use different words, of course: “outcomes-based learning,” “learning analytics.”)

Online, “personalization” is how we – “we the user” and “we the consumer” are the frames – are convinced to take certain actions, buy certain products, click on certain buttons, see certain information (that is to say, learn certain things). “Personalization” is facilitated by the pervasive collection of data, which is used to profile and segment us. We enable this both by creating so much data (often unwittingly) and surrendering so much data (often voluntarily) when we use new, digital technologies. “The personal computer” and such.

(You know it’s “personal.” You get to change the background image. It’s “personalized,” just like those “personalized” Coke bottles.)

The personal computer first emerged as a consumer product in the 1970s – decades after educational technologists and educational psychologists had argued that machines could “personalize” (or at the time, “individualize”) education.

Among these first teaching machines was the one built by Ohio State University psychology professor Sidney Pressey. His device, “the Automatic Teacher,” was constructed out of typewriter parts. He debuted it at the 1924 American Psychological Association meeting. A little window displayed a multiple-choice question, and the student could press one of four keys to select the correct answer. The machine could be used to test a student – that is, to calculate how many right answers were chosen overall; or it could be used to “teach” – the next question would not be revealed until the student got the first one right, and a counter would keep track of how many tries it took.
The “Automatic Teacher” wasn’t Pressey’s first commercial move. In 1922, he and his wife published *Introduction to the Use of Standard Tests*, a “practical” and “non-technical” guide meant “as an introductory handbook in the use of tests” aimed to meet the needs of “the busy teacher, principal or superintendent.” By the mid-1920s, the two had over a dozen different proprietary standardized tests on the market, selling a couple of hundred thousand copies a year, along with some two million test blanks.

Yes, standardized testing had already become commonplace (in the American classroom at least) by the 1920s, and this practice placed a significant burden upon those teachers and clerks tasked with scoring them. Pressey argued that the automation of testing could “free the teacher from much of the present-day drudgery of paper-grading drill, and information-fixing – it should free her for real teaching of the inspirational.” No doubt, these arguments echo those made today about how ed-tech will free the teacher for more individualized attention, instruction, and remediation.

But I think Pressey’s work also serves to underscore this other tension that we find throughout the twentieth century. This isn’t simply about “labor-saving devices” or instructional or administrative efficiency. The “Automatic Teacher” was also a technology of individualization, one that Pressey and others since have insisted was necessitated by the practices and systems of standardization in schools, by the practices and systems of mass education itself.

It’s significant, I think, that early teaching machines were developed by psychologists and justified by psychology – very much a science of the twentieth century. After all, psychology – as a practice, as a system – helped to define and theorize the individual, “the self.” Self-management. Self-reflection. Self-help. Self-control.

Individualization through teaching machines is therefore a therapeutic and an ideological intervention, one that’s supposed to act as a salve in a system of mass education. And this has been the project of education technology throughout
the twentieth century.

I recognize that I put “pigeons” in the title of this talk and I haven’t yet made the connection between the history of personalization and the history of pigeon training. It’s there in the history of educational psychology, in the history of behavioral modification, in the history of teaching machines. But I opted to scrap the ending I’d originally written for this talk – one that, I promise, tied it all together. Instead of the pigeons of ed-tech, I feel compelled to end with some thoughts on the politics of ed-tech.

Institutions face an enormous crisis today – one of credibility and trust, one that Chris Hayes identified in 2012 in his book *Twilight of the Elites*. He argued that

> We now operate in a world in which we can assume neither competence nor good faith from the authorities, and the consequences of this simple, devastating realization is the defining feature of American life at the end of this low, dishonest decade. Elite failure and the distrust it has spawned is the most powerful and least understood aspect of current politics and society. It structures and constrains the very process by which we gather facts, form opinions,
and execute self-governance. It connects the Iraq War and the financial crisis, the Tea Party and MoveOn, the despair of laid-off autoworkers in Detroit to the foreclosed homeowners in Las Vegas and the residents of the Lower Ninth Ward in New Orleans: nothing seems to work. All the smart people fucked up, and no one seems willing to take responsibility.

We can add to Haye’s list, of course, more recent events: Brexit and Donald Trump and the latter’s withdrawal last week from the Paris Climate Accord. They can’t even get the weather report right, the President of the United States of America reportedly quipped to friends over golf; why should we trust climate scientists? This “death of expertise” has profound implications, no doubt, for the future of education, scholarship, teaching and learning, democracy. And, as Andrew Keen observed yesterday, we must consider the ways in which “populism” and “personalization” as cultural and political and economic forces might actually be intertwined – how the algorithmically-driven Facebook’s News Feed, most obviously, has only served to make things worse.

A journalist recently asked the US Secretary of Education about different rates of discipline for students of color and students with disabilities, and if this was a problem her office intended to address. Addressing the racial disparities in school discipline – and addressing this as a civil rights issue – had been a major focus of the Obama Administration’s final few months. Betsy DeVos responded, “I think that every student, every individual is unique and special and we need to be really intent on focusing on the needs of each individual student.”

For DeVos – and for many, many others – “personalized learning” means just this: “we need to be really intent on focusing on the needs to each individual student.” The needs of the individual to the benefit of the individual. But to DeVos – and to many, many others – exalting the freedom of the individual here also means freedom from government control (from government control over the education system). It’s not freedom from corporations, oh no; it’s freedom from the state and more explicitly freedom from the regulations that have
been put in place in the last sixty years to try to force educational institutions to be more equitable. We heard Donald Clark argue yesterday that schools need to become unsafe spaces again, but let’s recognize that schools have never been “safe spaces” for most of the people on this planet.

When Betsy DeVos and others say that “we need to be really intent on focusing on the needs to each individual student,” what she doesn’t add is that all risk, in this worldview, would fall on the individual as well, of course. In a world with no institutions – unbundled and disintermediated as Silicon Valley is clearly keen to do – there are no institutional protections. With no government oversight, there is no appeal to civil rights.

So, this is our challenge in the face of those calling for “personalized learning” – the Betsy DeVoses and the Mark Zuckerbergs. And it’s our challenge, not only in education technology, but in democracies more generally: can we maintain a shared responsibility for one another when institutions are dismantled and disrupted? Will we have any semblance of collective justice in a “personalized,” algorithmically-driven world?
II. IN FELLOWSHIP
Every year since 2010, I’ve undertaken a fairly massive project in which I’ve reviewed the previous twelve months’ education and technology news in order to write ten articles covering “the top ed-tech trends.” This is how I spend my November and December – researching and writing a series that usually tops out at about 75,000 words (which I didn’t realize until print copies were made for my visit here is about 240 pages).

Now, all those words and pages make this quite a different undertaking than most year-in-review stories, than much of the “happy new year” clickbait that tend to offer a short, bulleted list of half a dozen or so technologies that are new enough or cool enough to hype with headlines like “these are the six tools poised to revolutionize education.” To be honest, these sorts of articles are partly why I undertake this project – although each year, when I’m about 15,000 words in, I do ask myself “why am I doing this?!” (This talk will hopefully serve as an explanation for you and a nice reminder for me.)

Last year, I gave a lecture at Virginia Commonwealth University titled “The Best Way to Predict the Future Is to
Issue a Press Release.” (The transcript is on my website and in *The Curse of the Monsters of Education Technology.*) It was one articulation of what’s a recurring theme in my work: we must be more critical about the stories we tell and we’re told about the future of education. Indeed, we need to look at histories of the future and ask why certain people have wanted the future to take a certain shape, why certain technologies (and their stories) have been so compelling.

To be clear then when I write my “trends” series, it’s not meant to be predictive. Rather it’s a history itself – ideally one that’s useful for our thinking about the past, present, and future in the way in which the study of history always should be. It’s a look back at what’s happened over the course of each year, not simply – to counter that totally overused phrase from hockey player Wayne Gretsky’s dad – to “skate to where the puck is going,” but to examine where it has been. And more importantly, to ascertain where some folks – those who issue press releases, for example – want the puck to head.

So, I am not here to tell you, based on my analysis of ed-tech “trends,” what new tools you should buy or what new tools you should incorporate into your teaching or what old tools you should discard. That’s not my role – I’m not an advocate or evangelist or salesperson for ed-tech.

I realize this makes some people angry – “she didn’t tell us what we should do!” some folks always seem to complain about my talks. “She didn’t deliver a fully fleshed-out 300-point plan to ‘fix education.’” “She didn’t say anything positive about technology, dammit.”

That’s not the point of my work. I’m not a consultant hired to talk you through the implementation of your next project. My work is not “market research” in the way that “market research” typically functions (or in the way “market research” hopes it functions). According to the press releases at least, ed-tech markets are always growing larger. The sales are always increasing. The tech is always amazing.

I want us to think more critically about all these claims – about the politics, not just the products (perhaps so the next time
we’re faced with consultants or salespeople, we can do a better job challenging their claims or advice).

As you can see, much of what I write isn’t really about technologies at all, but rather about the ideologies that are deeply embedded with them. I write about technologies as practices – political practices, pedagogical practices – not simply tools, practices that tools might enable and that tools might foreclose.

Throughout the year, I follow the money, and I follow the press releases. I scrutinize the headlines. I listen to stories. I try to verify the (wild, wild) claims of marketers and salespeople and politicians. I look for the patterns in the promises that people make about what technologies will do for and to education. And it’s based on these patterns that I eventually select the ten “Top Ed-Tech Trends” for my year-end review.

They’re not “trends,” really. They’re themes. They’re categories. They’re narratives.

And admittedly, because of my methods, how I piece my research together, they’re narratives that are quite US-centric. I’d say even more specifically, they’re California- and Silicon Valley-centric.

I use “Silicon Valley” in my work as a shorthand to describe the contemporary high-tech industry – its tech and just as importantly, its ideology. Sticklers about geography will readily point out that the Silicon Valley itself isn’t the most accurate descriptor for the locus of today’s booming tech sector. It ignores what happens in Cambridge, Massachusetts, for example: the site of Harvard and MIT. It ignores what happens in Seattle: the home of Amazon, Microsoft, and the Bill and Melinda Gates Foundation. (The influence of Bill Gates in education and education technology policy really cannot be overstated. Bill Gates is not part of Silicon Valley per se, but the anti-democratic bent of his philanthropic efforts – justified through claims about “genius,” through a substitution with charity (which is also a tax write-off) for justice – is absolutely part of the “Silicon Valley narrative.”)
Silicon Valley is itself just one part of Northern California, one part of the San Francisco Bay area – the Santa Clara Valley. Santa Clara Valley’s county seat and the locus of Silicon Valley (historically at least) is San Jose, not San Francisco or Oakland, where many startups are increasingly located today. Silicon Valley does include Mountain View, where Google is headquartered. It also includes Cupertino, where Apple is headquartered. It includes Palo Alto, home to Stanford University, founded in 1885 by railroad tycoon Leland Stanford.

The “silicon” in “Silicon Valley” refers to the silicon-based integrated circuits that were first developed and manufactured in the area. But I extend the phrase “Silicon Valley” to all of the high-tech industry, not just the chip makers. And those chip makers aren’t all located in the area these days. Arguably the phrase “Silicon Valley” obscures the international scope of the operations of today’s tech industry – tax havens in Ireland, manufacturing in China, and so on.

But if the scope is international, the flavor is distinctly Californian. A belief in the re-invention of the self. A “dream factory.” A certain optimism for science as the penultimate solution to any of the world’s problems. A belief in technological utopia. A belief in the freedom of information technologies, in information technologies as freedom. An advocacy for libertarian politics – think Peter Thiel (a Stanford graduate) now advising Donald Trump. A faith in the individual and a distrust for institutions. A fierce embrace of the new. A disdain for the past.

California – the promised land, the end-of-the-road of the US’s westward (continental) expansion, the fulfillment of Manifest Destiny, colonization upon colonization, the gold rush, the invention of a palm-tree paradise. The California too of military bases and aeronautics and oil. California, one of the largest economies in the world. The California that imagines itself – and hopes others imagine it – in Silicon Valley and Hollywood but not on the farms of the Central Valley. That’s the California that feeds us. It’s all a California that ignores race and labor and water and war.
The California that once could boast the greatest public higher education system in the US – that is until Ronald Reagan became governor of the state in 1966 after campaigning on a vow to “clean up that mess in Berkeley” and promising during his first year in office that he’d make sure taxpayers in the state were no longer “subsidizing intellectual curiosity.” We can see in Reagan’s pledge the roots of ongoing efforts to defund public education, something that enabled for-profit schools to step in to meet the demand for college. We can see too in Reagan a redefinition of the purpose of higher ed – it’s not about “intellectual curiosity”; it’s about “jobs,” it’s about “skills.”

Despite thinking of themselves as liberal-learning, today’s tech companies re-inscribe much of this. “Everyone should learn to code,” as they like to tell us. “Higher education is a bubble,” as Peter Thiel has said. “Disrupt.” “Unbundle.” “It’s like Uber for education.” And so on.

“The Californian Ideology,” as Richard Barbrook and Andy Cameron described all this in their terrifically prescient essay from 1995, does not tend to make many lists of the “top ed-tech trends.” But the ideology permeates our digital technologies, whether we like it or not. And if and when we ignore it, I fear we misconstrue what’s going on with Silicon Valley’s products and press releases.

We’re more likely to overlook the role that venture capital plays, for example. 2015 was a record-setting year for investment in education technology, with some $4 billion flowing into the industry globally. But the total dollars fell sharply in 2016 – “only” $2.2 billion. The number of investments fell by 11%. (It’s a bit too early to tell what 2017 will bring.)

I repeatedly select “the business of ed-tech” as one of my “top ed-tech trends” because I think it’s crucial to questions about investors’ interest in education and education technology. What sorts of companies and what sorts of products do venture capitalists like, for example? What’s the appeal – profits, privatization? (Turns out, lately investors like testing
companies, tutoring companies, “learn to code” companies, and private student loan providers.) Why has investment fallen off? (Turns out that “free” might not be the best business model for a for-profit company, particularly one that cannot rely on advertising the same way that other “free” products like Facebook and Google can. Turns out too that a lot of the education startups that have been promising “revolution” or hell even “improved outcomes” for the past few years have been selling snake oil. Turns out that the typical timeline that venture capitalists work with – about three to five years after making their investment, they expect a return in the form of an acquisition or a public offering and very, very few ed-tech companies go public. Turns out that Pearson, which once funded and acquired a lot of startups, isn’t in particularly good financial shape itself.)

Now, it’s so very typically American to come to the UK to talk about ed-tech and to insist “oh really, it’s all about the US – our values.” “It’s all about the state I live in” even – to invoke Pearson, a company founded in Yorkshire in 1844, the largest education company in the world, and still insist that the “Silicon Valley narrative” and the “California ideology” are the dominant forces shaping education technology. (I’m not thrilled about this either, mind you!)

In Distrusting Educational Technology, sociologist Neil Selwyn identifies three contemporary ideologies that are intertwined with today’s digital technologies – my reference to “Silicon Valley narratives” are meant to invoke these: libertarianism, neoliberalism, and “the ideology of the ‘new economy.’” Selwyn writes,

Most people, it would seem, are happy to assume that educational technologies are “neutral” tools that are essentially free from values and intent (or, at most, shaped by generally optimistic understandings and meanings associated with educational change and improvement). In this sense, it is difficult at first glance to see educational technology as entwined with any aspect of the dominant ideologies just described. Yet, as was noted earlier, one of the core
characteristics of hegemony is the ability of dominant ideologies to permeate commonsensical understandings and meaning. Following this logic, then, the fact that educational technology appears to be driven by a set of values focused on the improvement of education does not preclude it also serving to support and legitimate wider dominant ideological interests. Indeed, if we take time to unpack the general orthodoxy of educational technology as a “positive” attempt to improve education, then a variety of different social groups and with different interests, values and agendas are apparent. …While concerned ostensibly with changing specific aspects of education, all of these different interests could be said to also endorse (or at least provide little opposition to) notions of libertarianism, neo-liberalism and new forms of capitalism. Thus, educational technologies can still be said to be “ideologically freighted”, although this may not always be a primary intention of those involved in promoting their use.

I’d add another ideological impulse that Selwyn doesn’t mention here: that is, a fierce belief in technological solutionism (I’m building on Evgeny Morozov’s work here) – if students are struggling to graduate, or they’re not “engaged,” or they’re not scoring well on the PISA test, the solution is necessarily technological. More analytics. More data collection. More surveillance.

I would point to this “ideological freighted-ness” in almost all of the trends in which I’ve written about since 2010. You can see neoliberalism, for example, in efforts towards privatization and the outsourcing of core technological capacities to third party vendors. (This is part of the push for MOOCs, we must be honest.)

I’m not sure there’s any better expression of this “Silicon Valley narrative” or “California ideology” than in “personalization,” a word used to describe how Netflix suggests movies to us, how Amazon suggests products to do, how Google suggests search results to us, and how educational
Software suggests the next content module you should click on. Personalization, in all these manifestations, is a programmatic expression of individualism. The individual, as the Silicon Valley narrative insists, whose sovereignty is most important, whose freedom is squelched by the collective. Personalization – this belief that the world can be and should be algorithmically crafted to best suit each individual individually (provided, of course, that individual’s needs and desire coincide with the person who wrote the algorithm and with the platform that’s promising “personalization.”)

Personalization. Platforms. These aren’t simply technological innovations. They are political, social – shaping culture and politics and institutions and individuals in turn.

In 2012, I chose “the platforming of education” as one of the “top ed-tech trends.” I made that selection in part because several ed-tech companies indicated that year that this was what they hoped to become – the MOOC startups, for example, as well as Edmodo, a social network marketed to K–12 schools. And “platforming” was a story that technology companies were telling about their own goals too. To become a platform is to be “the next Facebook” or “the next Google” (and as such, to be a windfall for investors).

Platforms aim to centralize services and features and functionality so that you go nowhere else online. They aspire to be monopolies. Platforms enable and are enabled by APIs, by data collection and transference, by data analysis and data storage, by a marketplace of data (with users creating the data and users as the product). They’re silos, where all your actions can be tracked and monetized. In education, that’s the learning management system (the VLE) perhaps.

I wondered briefly last year if we were seeing a failure in education platforms – or at least, a failure to fulfill some of the wild promises that investors and entrepreneurs were making back in 2012. A failure to “platform.” Despite raising some $87.5 million in venture capital, for example, Edmodo hadn’t even figured out a business model, let alone become a powerful platform. Similarly, MOOC startups have now all
seemed to pivot towards corporate technology training, but certainly all corporate training isn’t running through these companies. Neither Coursera nor Udacity nor edX have become corporate training platforms, although perhaps that’s what Microsoft hopes to become, as a result of its acquisition of the professional social network LinkedIn, which had previously acquired the online training company Lynda.com.

Platforms haven’t gone away, even if specifically education technology companies haven’t successfully platformed education – yet. Technology companies, on the other hand, seem well poised to do so – not just Microsoft, but Google and Apple, of course. And even Facebook has made an effort to this end, partnering with a chain of charter schools in the US, Summit Public Schools, in order to build a “personalized learning platform.” From the company’s website:

The platform comes with a comprehensive curriculum developed by teachers in classrooms. The base curriculum is aligned with the Common Core, and each course includes meaningful projects, playlists of content and assessments, all of which can be customized. Teachers can adapt or create new playlists and projects to meet their students’ needs.

“Playlists” – this seems to be one of the latest buzzwords connected to personalization. “Students build content knowledge by working at their own pace and take assessments on demand,” the Summit website says. But while students might be able to choose which order they tackle the “playlist,” there isn’t really open inquiry about what “songs” (if you will) they get to listen to.

AltSchool is another Silicon Valley company working on a “personalized learning platform.” It was founded in 2014 by Max Ventilla, a former Google executive. AltSchool has raised $133 million in venture funding from Zuckerberg Education Ventures, the Emerson Collective (the venture philanthropy firm founded by Steve Jobs’ widow Laurene Powell Jobs), Founders Fund (Peter Thiel’s investment firm), Andreessen Horowitz, and others.
The AltSchool classroom is one of total surveillance: cameras and microphones and sensors track students and teachers – their conversations, their body language, their facial expressions, their activities. The software – students are all issued computing devices – track the clicks. Everything is viewed as a transaction that can be monitored and analyzed and then re-engineered. Stirling University’s Ben Williamson has written fairly extensively about AltSchool, noting that the company describes itself as a “full stack” approach to education. From the AltSchool blog,

As opposed to the traditional approach of selling or licensing technology to established organizations, the full stack startup builds and manages a complete end-to-end product or service, thereby bypassing incumbents.

So why take a full stack approach to education?

“You want to own the total outcome,” says A16z General Partner and AltSchool investor, Lars Delgaard. “We are building the world’s biggest private school system. To make that experience the one we want – one that is more affordable, better, and revolutionary – you need to have full ownership.”

While the company initially started as with aspirations of launching a chain of private schools, like many education startups, it’s had to “pivot” – focusing less on opening schools (hiring teachers, recruiting students) and more on building and selling software (hiring engineers, hiring marketers). But it retains, I’d argue, this “full stack” approach. Rather than thinking about the platforming of education as just a matter of centralizing and controlling the software, the data, the analytics, we have this control spilling out into the material world – connected to sensors and cameras, but also shaping the way in which all the practices of school happen and – more frighteningly, I think – the shape our imagination of school might take.

John Herrman recently wrote in *The New York Times* that
Platforms are, in a sense, capitalism distilled to its essence. They are proudly experimental and maximally consequential, prone to creating externalities and especially disinclined to address or even acknowledge what happens beyond their rising walls. And accordingly, platforms are the underlying trend that ties together popular narratives about technology and the economy in general. Platforms provide the substructure for the “gig economy” and the “sharing economy”; they’re the economic engine of social media; they’re the architecture of the “attention economy” and the inspiration for claims about the “end of ownership.”

Platforms are not substitutes for community. They are not substitutes for collective political action. We should resist the platforming of education, I’d argue. We should resist because of the repercussions for labor – the labor of teaching, the labor of learning. We should resist because of the repercussions for institutions, for the law, for democracy.

And these are the things I try to point out when I select the “top ed-tech trends” – too many other people want us to simply marvel at their predictions and products. I want us to consider instead the ideologies, the implications.
6 WHY “A DOMAIN OF ONE’S OWN” MATTERS

These remarks were given on 4 April 2017 at Coventry University as part of my visiting fellowship at the Disruptive Media Learning Lab.

I am best known, no doubt, for my criticism of education technology. And perhaps for that reason, people perk up when I point to things that I think are interesting or innovative (and to be clear, interesting or innovative because of their progressive not regressive potential).

Often when I say that I think that the “Domain of One’s Own” initiative is one of the most important education technologies, I always hear pushback from the Twitter riffraff. “What’s so special about a website?” folks will sneer.

Well, quite a lot, I’d contend. The Web itself is pretty special – Sir Tim Berners-Lee’s vision of a global hyperlinked information system. A system that was – ideally at least – openly available and accessible to everyone, designed for the purpose of sharing information and collaborating on knowledge-building endeavors. That purpose was not, at the outset, commercial. The technologies were not, at the outset, proprietary.

The World Wide Web just had its 28th anniversary, and Tim Berners-Lee penned an article – an “open letter” – in which he
identified three major trends that he’s become increasingly worried about:

_We’ve lost control of our personal data._

_It’s too easy for misinformation to spread on the Web._

_Political advertising online needs transparency and understanding._

These are trends that should concern us as citizens, no doubt. But they’re expressly trends that should concern us as educators.

I think we could slightly reword these trends too to identify problems with education technology as it’s often built and implemented:

_Students have lost control of their personal data._

_By working in digital silos specially designed for the classroom (versus those tools that they will encounter in their personal and professional lives) students are not asked to consider how digital technologies work and/or how these technologies impact their lives._

_Education technologies, particularly those that enable “algorithmic decision-making,” need transparency and understanding._

(You can substitute the word “scholar” for “student” in all cases above, too, I think.)

By providing students and staff with a domain, I think we can start to address this. Students and staff can start to see how digital technologies work – those that underpin the Web and elsewhere. They can think about how these technologies shape the formation of their understanding of the world – how knowledge is formed and shared; how identity is formed and expressed. They can engage with that original purpose of the Web – sharing information and collaborating on knowledge-building endeavors – by doing meaningful work online, in the public, with other scholars. That they have a space of their own online, along with the support and the tools to think about
what that can look like.

It doesn’t have to be a blog. It doesn’t have to be a series of essays presented in reverse chronological order. You don’t have to have comments. You don’t have to have analytics. You can delete things after a while. You can always make edits to what you’ve written. You can use a subdomain. (I do create a new subdomain for each project I’m working on. And while it’s discoverable – ostensibly – this work is not always linked or showcased from the “home page” of my website.) You can license things how you like. You can make some things password-protected. You can still post things elsewhere on the Internet – long rants on Facebook, photos on Instagram, mixes on Soundcloud, and so on. But you can publish stuff on your own site first, and then syndicate it to these other for-profit, ad-based venues.

I recognize that learning these technologies takes time and effort. So does learning how to navigate the VLE. Website design, I promise you – skills like HTML and CSS and Markdown – are going to look better on a CV than… well, no one boasts they can use a VLE except instructional technologists, and I don’t think the mission of Coventry is to graduate hundreds of those.

I’m pretty resistant to framing “domains” as simply a matter of “skills.” Because I think its potential is far more radical than that. This isn’t about making sure literature students “learn to code” or history students “learn to code” or medical faculty “learn to code” or chemistry faculty “learn to code.”

Rather it’s about recognizing that the World Wide Web is site for scholarly activity. It’s about recognizing that students are scholars.

Washington State University’s Mike Caulfield has laid out a different set of concerns than Tim Berners-Lee’s (although I think they overlap substantially when it comes to questions of misinformation and democracy). Mike talks about the difference between what he describes as the “garden” and the “stream.” The stream are the other threats to the Web, I’d argue – these are Twitter and Facebook most obviously. The
status updates and links that rush past us, often stripped of context and meaning and certainly stripping us of any opportunity for contemplation or reflection. The garden, on the other hand, encourages just that. It does so by design.

And that’s the Web. That’s your domain. You cultivate ideas there – quite carefully, no doubt, because others might pop by for a think. But also because it’s your space for a think.
7 “TECHNOLOGY-ENHANCED RETENTION” AND OTHER ED-TECH INTERVENTIONS

These remarks were given on 5 April 2017 at Coventry University as part of my visiting fellowship at the Disruptive Media Learning Lab. I took part in a panel on "Technology-Enhanced Student Attainment and Retention" with Daniel Burgos from the International University of La Rioja and Lynn Clouder from Coventry University.

As I prepped for my remarks here, I did stop to think a bit about whether I’m the right respondent – am I a social scientist? My formal academic training was really much more in the humanities – I dropped out of a PhD program in Comparative Literature. I do have a graduate degree in Folklore Studies, which is a kin of anthropology and is a field that is a bit of both, I suppose: social sciences and the humanities. I do consider myself, in some ways, an ethnographer. What I am not – not really or not particularly well – is a quantitative researcher. Or at least, I’ve never taken a class in educational research methods, and it’s been about 20 years since I took a class in statistics. I have only the vaguest recollection of what p values are and why they’re significant (I think that’s a bit of word play. But I am not certain).

What I do have, with full confidence, is a solid rolodex. I have friends who do education research and run regression tables
for a living. And when press releases about studies on various education technologies cross my desk, I often ask for their help in deciphering the findings.

That’s what journalists should do instead of relying on the PR or on the abstracts from journal articles – which in fairness, if you don’t have access to a research library is sometimes all you can read. That’s what academics and administrators should do instead of relying on the PR or on the salespeople who offer you freebies at conferences.

But let me pause for a minute and restate that: when press releases about studies on various education software cross my desk… Press releases, my inbox is full of them – sometimes from universities, more often from the software makers themselves. Salespeople, the industry is full of them. There’s a lot of marketing about educational software. There’s a lot of hype about educational software. But that’s not necessarily because there’s a lot of solid research that demonstrates “effectiveness” or (and this is key) a lot of “good” ed-tech.

And I’ll say something that people might find upsetting or offensive: I’m not sure that “solid research” would necessarily impress me. I don’t actually care about “assessments” or “effectiveness.” That is, they’re not interesting to me as a scholar. My concerns about “what works” about ed-tech have little to do with whether or not there’s something we can measure or something we can bottle as an “outcome”; indeed, I fear that what we can measure often shapes our discussions of “effect.”

What interests me nonetheless are the claims that are made about ed-tech – what we are told it can do. I listen for these stories and the recurring themes in them because I think they reveal a number of really important things: what we value, who we value in education; how we imagine learning happens; what we think is wrong with the current model of teaching and/or system of education; what we think will fix all this; and so on.

(I use that pronoun “we” in its broadest sense. Like “we all humans.” I do want us to recognize there are many, many
competing values and many, many competing visions for education. And that means there are lots of opinions – many, many that are grounded in “research” and many, many that are peddled by researchers themselves – about what we should do to make teaching and learning “better.”

Why does attainment matter, for example? To whom does attainment matter? What do we mean by attainment? Is it something we can measure? Is it something that education can actually intervene upon? If so, how? If so, in what ways? Why does retention matter? To whom does retention matter? Why? Why do we use words like “intervention” to describe our efforts to address “retention” or “attainment”?

Do we use the word “intervention” because it’s a medical term? A scientific term? Are we diagnosing something about students?

As such, I’m very interested in the phrase “technology-enhanced” in the title of this panel. First of all, I think it does underscore that what we do without technology – to attain, to retain – doesn’t work. (We can ask “doesn’t work for whom?”) Let’s consider why not. Is it an institutional issue? A systemic, societal one? Is there something “wrong” with students? Do we see this as a human issue? Or, as it’s “technology-enhanced,” is it an engineering problem?

My concern, I think – and I repeat this a lot – is that we have substituted surveillance for care. Our institutions do not care for students. They do not care for faculty. They have not rewarded those in it for their compassion, for their relationships, for their humanity.

Adding a technology layer on top of a dispassionate and exploitative institution does not solve anyone’s problems. Indeed, it creates new ones. What do we lose, for example, if we more heavily surveil students? What do we lose when we more heavily surveil faculty? The goal with technology-enhanced efforts, I fear, is compliance not compassion and not curiosity. So, sure, some “quantitative metrics” might tick upward. But at what cost? And at what cost to whom?
8 “EDUCATION TECHNOLOGY’S COMPLETELY OVER”

This was the first-half of a joint presentation at Coventry University on 7 April 2017 as part of my visiting fellowship at the Disruptive Media Learning Lab. The better half was delivered by Jim Groom. Our topic, broadly speaking: "a domain of one's own"

“The Internet’s completely over,” Prince told The Daily Mirror in 2010. People laughed at him. Or many of the digital technorati did. They scoffed at his claims, insisting instead that the Internet was inevitable. The Internet was the future of everything.

When it came to music, the technorati contended, no longer would any of us own record albums. (We wouldn’t own books or movies or cars or houses either. Maybe we wouldn’t even own our university degrees.) We’d just rent. We’d pay for subscription services. We’d stream singles instead. We’d share – well, not really “share,” but few would complain when a post-ownership society got labeled as such. Few would care, of course, except those of us struggling to make money in this “new economy.”

Prince was wrong about the Internet, the technorati insisted. Turns out, Prince was right. The “new economy” sucks. It’s utterly exploitative.
But many technorati would never admit that Prince was right—perhaps until Prince’s death this time last year when everyone hailed him as one of the greatest artists of our day. The Electronic Frontier Foundation, for example—an organization that, as its name suggests, sees itself as a defender of “Internet freedom,” particularly with regards to copyright and free speech online—had inducted Prince into the Takedown Hall of Shame in 2013, establishing and then awarding him with the “Raspberry Beret Lifetime Aggrievement Award for extraordinary abuses of the takedown process in the name of silencing speech.” Prince was, no doubt, notorious for demanding that bootleg versions of his songs and his performances be removed from the Web. He threatened websites like YouTube with lawsuits; he demanded fans pull photos and lyrics and cellphone videos offline. It was, until recently, almost impossible to find Prince’s music on streaming services like Spotify or video services like YouTube.

Thus, Prince was viewed by some as a Luddite. But many of those folks utterly misunderstood Prince’s relationship to technologies—much like many, I’d argue, misconstrue what the Luddites in the early nineteenth century were actually so angry about when they took to smashing looms.

It was never about the loom per se. It’s always about who owns the machines; it’s about who benefits from one’s labor, from one’s craft.

From the outset of his career, Prince was incredibly interested in computers and with technological experimentation—in how computers might affect art and relationships and creativity and love. He released an interactive CD-ROM in 1994, for example, a game that played a lot like another popular video game at the time, *Myst*. That video game was one of the few ways you could get ahold of the original font file for the symbol that Prince had adopted the previous when he officially changed his name. (His label was forced to mail floppy disks with the font to journalists so they could accurately write about the name change.) You could see Prince’s interest in computer technologies too in songs like
“Computer Blue” from the *Purple Rain* soundtrack (1984) and “My Computer” from the album (his nineteenth) *Emancipation* (1996). The lyrics in the latter, which some argue presage social media – okay, sure – but perhaps more aptly simply reflect someone who was active in (or at least aware of) the discussion forums and chatrooms of the 1990s:

*I scan my computer looking 4 a site  
Somebody 2 talk 2, funny and bright  
I scan my computer looking 4 a site  
Make believe it’s a better world, a better life*

The following year, Prince released *Crystal Ball*, and in what was a novel move at the time, put all the album’s liner notes online, via a fairly new technology called a “Web site.” A few years later, Prince launched a subscription service that promised to give fans exclusive access to new music, again via a site he controlled.

See, Prince didn’t hate the Internet per se, although he certainly had a complicated relationship with what has become an increasingly commodified and exploitative Internet and Web (one actively commodifying and exploiting not just musicians and recording artists). Rather, the problem that Prince identified with the Internet was that it enables – is built on, really – the idea of multiple digital copies, permission-less digital copying. And Prince has always, always fought to retain control of the copies of his work, to retain control of his copyright.

“I don’t see why I should give my new music to iTunes or anyone else,” Prince told *The Daily Mirror* in that 2010 interview.

They won’t pay me an advance for it and then they get angry when they can’t get it."

The internet’s like MTV. At one time MTV was hip and suddenly it became outdated. Anyway, all these computers and digital gadgets are no good. They just fill your head with numbers and that can’t be good for you.
He later clarified what he meant to The Guardian: “What I meant was that the internet was over for anyone who wants to get paid, and I was right about that. Tell me a musician who’s got rich off digital sales. Apple’s doing pretty good though, right?”

If you’re wondering why I’m talking about Prince today and not education technology, you’re not paying close enough attention to the ways in which the ed-tech industry gets rich off of the creative work (and the mundane work) of students and scholars alike. Indeed, I wanted to invoke Prince today and talk a little bit about how his stance on the Internet – and much more importantly, his stance on the control and the ownership of his creative work – might help us think about the flaws in education technology and how it views ownership and control of data, how it extracts value from us in order to profit from our labor, our intellectual property. And I hope that by retelling the story of Prince and the Internet, by telling a counter-narrative to one that’s simply “Prince hated it,” we can think about what’s wrong with how ed-tech – as an industry and as an institutional practice – treats those doing creative and scholarly work. Not because we hate or resist the Internet, but because we want to build and support technologies that are not exploitative or extractive.

Me, I will gladly echo Prince – I do so with the utmost respect and with a great deal of shock and sadness still to this day that he’s gone – “education technology’s completely over.”

“If you don’t own your masters, your master owns you,” Prince told Rolling Stone in 1996, on the cusp of the release of his album Emancipation. (A master recording is the first, the original recording of a song, from which all subsequent copies are made.) Prince had famously battled with Warner Bros over his contract and his catalog. He’d recorded with the label from 1978 to 1996 – and that included his biggest hit record, Purple Rain. Fighting with Warner Bros had prompted Prince to change his name to the symbol. Born Prince Rogers Nelson, Prince discovered that he didn’t even own his own name, let alone his music. He hoped that by changing his name, he’d be able to get out of his contract – or at least protest its terms. He
appeared with the word “slave” written on his cheek at the 1995 BRIT Awards. His acceptance speech at the event: “Prince. In concert: perfectly free. On record: slave.”

In 2014, Prince signed a deal to get his masters back. He controlled his music. The original copies of his music. He could decide what to release and what not to release and when and how to release it.

Prince fought for a long time with record labels, and arguably that makes his response to the new digital “masters” – Apple, Google, Spotify, and such – more understandable. But his assertions about masters and slaves are perhaps more than a little overstated, overwrought. And as such, I want to be a little cautious about making too much about a connection between the ownership of ideas and the ownership of bodies and how control and exploitation function in academia.

In the US (and I’m not sure how this works in the UK), if you request a copy of your educational records from your university, they send you a transcript. That is, they send you a copy. You can request a copy of your articles from academic publications. Rarely – although hopefully increasingly – do authors retain their rights. Students often find themselves uploading their content – their creative work – into the learning management system (the VLE). Perhaps they retain a copy of the file on their computer; but with learning analytics and plagiarism detection software, they still often find themselves having their data scanned and monetized, often without their knowledge or consent.

I want us to think about the ways in which students and scholars, like Prince, find themselves without control over their creative work, find themselves signing away their rights to their data, their identity, their future. We sign these rights away all the time. We compel students to do so. We tell them that this is simply how the industry, the institution works. You want a degree, you want a record label, you must use the institutional technology. You must give up your masters.

What's the matter with your life
Is the poverty bringing U down?
Is the mailman jerking U round?
Did he put your million dollar check
In someone else's box?

You needn’t. None of us need to. (Of course, none of us are Prince. Perhaps it seems a little overwhelming to fight the corporate masters like he did. But I believe that “domains” is one small step towards that.)
III. THE ROBOTS OF ED-TECH
9 DRIVERLESS ED-TECH: THE HISTORY OF THE FUTURE OF AUTOMATING EDUCATION

This talk was presented at The University of Edinburgh's Moray House School of Education on 30 March 2017

Let me begin with a story. In December 2012 – we all remember 2012, right? “The Year of the MOOC” – I was summoned to Palo Alto, California for a small gathering to discuss the future of teaching, learning, and technology. I use the verb “summoned” deliberately.

The event was organized by Sebastian Thrun, who at the beginning of the year had announced that he was resigning his full-time professor position at Stanford in order to launch Udacity, his online education startup. It was held at Stanford in its artificial intelligence lab, which was a little awkward a venue as Thrun’s office – he still had an office on campus, of course – was right next to those of Daphne Koller and Andrew Ng, his fellow Stanford AI professors who’d announced in April that they were launching a competitor company, Coursera.

When Thrun first invited us all to this event – about ten of us – he promised that at the end of the weekend, we would take a ride in a zeppelin over San Francisco. And I thought “like hell I will.” I’ve seen A View to a Kill. I know what happened to
the dissenters who got into a zeppelin in that movie. But as it turned out, the zeppelin company had gone out of business – I imagine that many people, like myself, could only think about Christopher Walken and Grace Jones’ characters and opted not to go.

So instead of a zeppelin, we got to ride in one of Google’s self-driving cars, which was of course the project that Thrun had been working on when he gave his famous TED Talk in 2011 – and that, in turn, was where he heard Salman Khan give his famous TED Talk. It was when and where Thrun decided that he needed to rethink his work as a Stanford professor in order to “scale” education.

Thrun “drove.” He steered the car onto I-280 and then let the car take over, and I have to say – and I say this as a professional skeptic of technology – it was this strange combination of the utterly banal and the utterly impressive. (It was 2012, I should reiterate, so it was right at the beginning of all this hype about a future of autonomous vehicles.)

The car was covered in cameras and sensors, inside and out – even a QR code on the driver’s side glove compartment that you were supposed to scan to sign Google’s Terms of Service before riding. Seemingly the most dangerous element of our little jaunt was that other drivers swerved and slowed down as they stared at the car, with its giant camera on top and Google logo on the sides. There was Thrun with his hands off the wheel, feet off the pedals, eyes not on the road, sometimes turning around entirely to face the passengers in the back seat, explaining how the car (and Google, of course) collected massive amounts of data in order to map the road and move efficiently along it.

Efficiency. That’s the goal of the self-driving car. (You’re free to insert here some invented statistic about the percentage of space and energy that are wasted by human-driven traffic and human driving patterns and that will be corrected by roads full of autonomous vehicles. I vaguely recall Thrun doing so at least.)

It was then and there on that trip that I had a revelation about
how many entrepreneurs and engineers in Silicon Valley conceive of education and the role of technology in reshaping it: that is, if you collect enough data – lots and lots and lots of data – you can build a map. This is their conceptual framework for visualizing how “learners” (and that word is used to describe various, imagined students, workers, and consumers) get from here to there, whether it’s through a course or through a degree program or towards a job. With enough data and some machine learning, you can identify – statistically – the most common obstacles. You can plot the most frequently traveled path and the one that folks traverse most quickly. You can optimize. And once you’ve trained those algorithms, you can apply them everywhere. You can scale.

We can debate this model (we should debate this model) – how it works or doesn’t work when applied to education. (Is learning “like a map”? Is learning an engineering problem? Is the absence of “data” or algorithms really a problem?) But one of the most important things to remember is that this is (largely) a computer scientist’s model. It’s the model of human learning by someone who claims expertise in machine learning, a field of study which has aspired to model if not surpass the human mind. And that makes it a model in turn that rests on a lot of assumptions about “learning” – both how humans “learn” and how machines “learn” to conceptualize and navigate their worlds.

It’s a model. It’s a metaphor.

It’s an aspiration – a human aspiration, to be clear. This isn’t what machines “want.” (Machines have no wants.)

I think many of us quickly recognized back in 2012 that, despite the AI expertise in the executive offices of these MOOC companies, there wasn’t much “artificial intelligence” beyond a few of their course offerings; there wasn’t much “intelligence” in their assessments or in their course recommendation engines. What these MOOCs were, nonetheless, were (and still are) massive online honeypots into which we’ve been lured – registering and watching and
clicking in order to generate massive education datasets.

Perhaps with this data, the MOOC providers can build a map of professional if not cognitive pathways. Perhaps. Someday. Maybe. In the meantime, these companies continue to collect a lot of “driving” data.

Who controls the mapping data and who controls the driving data and who controls the autonomous vehicle patents are, of course, a small part of the legal and financial battles that are brewing over the future of autonomous vehicles. Google versus Uber. Google versus Didi (a Chinese self-driving car company). We can speculate, I suppose, about what the analogous battles might be in education – which corporation will sue which corporation, claiming they “own” learning data and learning roadmaps and learning algorithms and learning software IP.

(Spoiler alert: it won’t actually be learners – just like it’s not actually drivers – even though that’s where the interesting data comes from: not from mapping the roads, but from monitoring the traffic.)

As we were driving on the freeways around Palo Alto in the Google autonomous vehicle, someone asked Sebastian Thrun what happens if there’s an unexpected occurrence while the car is in self-driving mode. Now, the car is constantly making small adjustments – to its speed, to its distance to other vehicles. “But what would happen if, say, a tree suddenly came crashing down in the road right in front of it,” the passenger asked Thrun.

“The car would stop,” he said. The human driver would be prompted to take over. Hopefully the human driver is paying attention. Hopefully there’s a human driver.

Of course, the “unexpected” occurs all the time – on the road and in the classroom.

Recently the “ride-sharing” company Uber flouted California state regulations in order to start offering an autonomous vehicle ride-sharing service in San Francisco. The company
admitted that it hadn’t addressed at least one flaw in their programming: that its cars would make a right-hand turn through a bicycle lane (the equivalent of a left-hand turn here in the UK). Uber didn’t have a model for recognizing the existence of “bike lane” (and as such “cyclists”). It’s not that the car didn’t see something “unexpected”; that particular “unexpected” was not fully modeled, and the self-driving car didn’t slow, and it didn’t stop.

In this testing phase of Uber’s self-driving cars, it did still have a driver sitting behind the wheel. Documents recently obtained by the tech publication *Recode* revealed that Uber’s autonomous vehicles drove, on average, less than a mile without requiring human intervention.

The technology simply isn’t that good yet.

At the conclusion of our ride, Thrun steered the Google self-driving car back to his house, where he summoned a car service to take us back to our hotel. Giddy from the experience, one professor boasted to the driver what we’d just done. He frowned. “Oh,” he said. “So, you just put me out of a job?”

“Put me out of a job.” “Put you out of a job.” “Put us all out of work.” We hear that a lot, with varying levels of glee and callousness and concern. “Robots are coming for your job.”

We hear it all the time. To be fair, of course, we have heard it, with varying frequency and urgency, for about 100 years now. “Robots are coming for your job.” And this time – *this time* – it’s for real.

I want to suggest – and not just because there are flaws with Uber’s autonomous vehicles (and there was just a crash of a test vehicle in Arizona last Friday) – that this is not entirely a technological proclamation. Robots don’t *do* anything they’re not programmed to do. They don’t have autonomy or agency or aspirations. Robots don’t just roll into the human resources department on their own accord, ready to outperform others. Robots don’t apply for jobs. Robots don’t “come for jobs.” Rather, business owners opt to automate rather than employ
people. In other words, this refrain that “robots are coming for your job” is not so much a reflection of some tremendous breakthrough (or potential breakthrough) in automation, let alone artificial intelligence. Rather, it’s a proclamation about profits and politics. It’s a proclamation about labor and capital.

And this is as true in education as it is in driving.

As *Recode* wrote in that recent article,

> Successfully creating self-driving technology has become a crucial factor to Uber’s profitability. It would allow Uber to generate higher sales per ride since it would keep all of the fare. Uber has currently suffered losses in some markets partly because of having to offer subsidies to attract drivers. Computers are cheaper in the long run.

“Computers are cheaper in the long run.” Cheaper for whom? Cheaper how?

Well, robots don’t take sick days. They don’t demand retirement or health insurance benefits. You tell them the rules, and they obey the rules. They don’t ask questions. They don’t unionize. They don’t strike.

A couple of years ago, there was a popular article in circulation in the US that claimed that the most common occupation in every state is “truck driver.” The data is a little iffy – the US is a service economy, not a shipping economy – but its claim about why “truck driver” is still fairly revealing: unlike other occupations, the work of “truck driver” has not been affected by globalization, the article claimed, and it has not (yet) been affected by automation. (The CEO of Otto, a self-driving trucking company now owned by Uber, just predicted this week that AI will reshape the industry within the next ten years.)

Truck driving is also a profession – an industry – that’s been subject to decades of regulation and deregulation.

That regulatory framework is just one of the objects of derision – of “disruption” and dismantling – of the ride-
sharing company Uber. Founded in 2008 – ostensibly when CEO Travis Kalanick was unable to hail a cab while in Paris – the company has become synonymous with the so-called “sharing” or “freelance” economy, Silicon Valley’s latest rebranding of technologically-enhanced economic precarity and job insecurity.

“Anyone” can drive for Uber, no special training or certification required. Well, anyone who’s 21 or older and has three years of driving experience and a clean driving record. Anyone with car insurance. Anyone whose car has at least four doors and is newer than 2001 – Uber will also help you finance a new car, even if you have a terrible credit score. Your loan payments are simply deducted from your Uber earnings each week.

All along, Uber has been quite clear, that despite wooing drivers to its platform, using “independent contractors” is only temporary. The company plans to replace drivers with driverless cars.

Since its launch, Uber has become infamous for its opposition to regulations and to unions. (Uber has recently been using podcasts broadcast from its app in order to dissuade drivers in Seattle from unionizing, for example.)

And I’ll note here in case this sounds too much like a talk on autonomous vehicles and not enough on automated education, I am purposefully putting these two “disruptions” side by side. After all, education is fairly regulated as well – accreditation, for example, dictates who gets to offer “real” degrees. There are rules about who gets to run a “real school.” Trump University, not a real school. And there are rules as to who gets to be in the classroom, rules about who can teach. But any semblance of job protections – at both the K–12 level and at the higher education level in the US – is under attack. (Again, this isn’t simply about replacing teachers with computers because computers have become so powerful. But it is about replacing teachers nonetheless.) You no longer need a teaching degree (or any teaching training) in Utah. And while the certification demands might still be in place in colleges and
universities, they’ve been moving towards a precarious teaching labor force for some time now. More than three-quarters of the teaching staff in the US are adjuncts – short-time employees with no job security and often no benefits. “Independent contractors.” Uber encourages educators to earn a little cash on the side as drivers.

Like I said, I’m not sure I believe that the most prevalent job in the US is “truck driver.” But I do know this to be true: the largest union in the United States is the National Education Association. The other teachers’ union, the American Federation of Teachers, is the sixth largest. Many others who work in public education are represented by the second largest union in the US, the Service Employees International Union.

Silicon Valley hates unions. It loathes organized labor just as it loathes regulations (until it benefits from regulations, of course).

Now, for its part, Uber has also been accused of violating “regulations” like the Americans with Disabilities Act for refusing to pick up riders with service dogs or with wheelchairs. A fierce proponent of laissez-faire capitalism, Uber has received a fair amount of negative press for its price gouging practices – it uses what it calls “surge pricing” during peak demand, increasing the amount a ride will cost in order, Uber says, to lure more drivers out onto the road. It’s implemented surge pricing not just on holidays like New Year’s Eve but during several weather-related emergencies. The company has also actively sabotaged its rivals – attacking other ride service companies as well as journalists.

None of this makes the phrase “Uber for Education” particularly appealing. But that’s how Sebastian Thrun described his company Udacity in a series of interviews in 2015.

“At Udacity, we built an Uber-like platform,” he told the MIT Technology Review. “With Uber any normal person with a car can become a driver, and with Udacity now every person with a computer can become a global code reviewer. … Just like Uber, we’ve made the financials line up. The best-earning
global code reviewer makes more than 17,000 bucks a month. I compare this to the typical part-time teacher in the U.S. who teaches at a college – they make about $2,000 a month.”

“We want to be the Uber of education,” Thrun told *The Financial Times*, which added that, “Mr Thrun knows what he doesn’t want for his company: professors in tenure, which he claims limits the ability to react to market demands.”

In other words, “disrupt” job protections through a cheap, precarious labor force doing piecemeal work until the algorithms are sophisticated enough to perform those tasks. Universities have already taken plenty of steps towards this end, without the help of algorithms or for-profit software providers. But universities are still bound by accreditation (and by tradition). “Anyone can teach” is not a stance on labor and credentialing that many universities are ready to take.

Udacity is hardly the only company that invokes the “Uber for Education” slogan. There’s PeerUp, whose founder describes the company as “Uber for tutors.” There’s ProfHire and Adjunct Professor Link, Uber for contingent faculty. There’s The Graide Network, “Uber” for teaching assistants and exam markers. There’s Parachute Teachers, which describes itself as “Uber for substitute teachers.”

Again, what we see here with these services are companies that market “on demand” labor as “disruption.” These certainly reflect larger trends at work dismantling the teaching profession – de-funding, de-professionalization, adjunctification, a dismissal of expertise and experience.

*Anyone can teach.* Indeed, the only ones who shouldn’t are probably the ones in the classroom right now – or so this story goes. The right-wing think tank The Heritage Foundation has called for an “Uber-ized Education.” The right-wing publication *The National Review* has called for “an Uber for Education.” Echoing some of the arguments made by Uber CEO Travis Kalanick, these publications (and many, many others) speak of ending the monopolies that “certain groups” (unions, women, liberals, I don’t know) have on education – ostensibly, I guess, on public schools – and bringing more
competition to the education system.

US Secretary of Education Betsy DeVos in a speech earlier this week also invoked Uber as a model that education should emulate: “Just as the traditional taxi system revolted against ridesharing,” she told the Brookings Institution, “so too does the education establishment feel threatened by the rise of school choice. In both cases, the entrenched status quo has resisted models that empower individuals.”

All this is a familiar refrain in Silicon Valley, which has really cultivated its own particular brand of consumerism wrapped up in the mantle of libertarianism.

Travis Kalanick is just one of many tech CEOs who have praised the work of objectivist “philosopher” and “novelist” Ayn Rand, once changing the background of his Twitter profile to the cover of her book *The Fountainhead*. He told *The Washington Post* in a 2012 Q&A that the regulations that the car service industry faced bore an “uncanny resemblance” to Rand’s other novel, *Atlas Shrugged*.

(A quick summary for those lucky enough to be unfamiliar with the plot: the US has become a dystopia overrun by regulations that cause industries to collapse, innovation to be stifled. The poor are depicted as leeches; the heroes are selfish individualists. Eventually business leaders rise up against the government, led by John Galt. The government collapses, and Galt announced that industrialists will rebuild the world. It is a terrible, terrible novel. It is nonetheless many libertarians’ Bible of sorts.)

I’ve argued elsewhere (and I’ve argued repeatedly) that libertarianism is deeply intertwined in the digital technologies developed by those like Uber’s Kalanick. And I don’t mean here simply or solely that these technologies are wielded to dismantle “big government” or “big unions.” I mean that embedded in these technologies, in their design and in their development and in their code, are certain ideological tenets – in the case of libertarianism, a belief in order, freedom, work, self-governance, and individualism.
That last one is key, I think, for considering the future of education and education technology — as designed and developed and coded by Silicon Valley. Individualism.

Now obviously these beliefs are evident throughout American culture and have been throughout American history. Computers didn’t *cause* neoliberalism. Computers didn’t *create* libertarians. (It just hooked them all up on Twitter.)

Indeed, there’s that particular strain of individualism that is deeply, deeply American which contributed to libertarianism and to neoliberalism and to computers in turn.

I’d argue that that strain of individualism has been a boon for the automotive industry — for car culture. Many Americans would rather drive their own vehicles rather than rely on — and/or fund — public transportation. I think this is both Uber’s great weakness and also, strangely, its niche: you hail a car, rather than take the bus. The car comes immediately; you do not have to wait. It takes you to your destination; you needn’t stop for others. As such, you can dismiss the need to develop a public transportation infrastructure as some cities in the US have done, some opting to outsource this to Uber instead.

In a car, you can move at your own pace. In a car, you can move in the direction you choose — when and where you want to go. In a car, you can stop and start, sure, but most often you want to get where you’re going efficiently. In a car — and if you watch television ads for car companies, you can see evidence of this powerful imaginary most strikingly — you are truly free.

Unlike the routes of public transportation — the bus route, the subway line — routes that are prescribed for and by the collective, the car is for you and you alone. The car is another one of these radically individualistic, individualizing technologies.

The car is a prototype of sorts for the concept of “personalization.”

And yet somehow this symbol of the personal, the individual.

We can think about the relationship too between education systems and individualism. I believe increasingly that’s how education is defined – not as a collective endeavor or a public good, but as an individual investment.

“Personalization” is a reflection of that.

“Personalized” education promises you can move at your own pace. You can (ostensibly) move in the direction you choose. You can stop and start, sure, but most often you want to get where you’re going efficiently. With “personalized” software – and if you read publications like Edsurge, you can see evidence of this powerful imaginary most strikingly – the learner is truly free.

Unlike the routes of “traditional” education – the lecture hall, the classroom – those routes that are prescribed for and by the collective, “personalized software” is for you and you alone. The computer is a radically individualistic, individualizing technology; education becomes a radically individualistic act.

(I’ll just whisper this because I’d hate to ruin the end of the movie for folks: this freedom actually involves you driving.)

Let me pause here and note that there are several directions that I could take this talk: data collection and analysis as “personalization,” for example. The New York Times just wrote about an app called Greyball that Uber has utilized to avoid scrutiny from law enforcement and regulators in the cities into which it’s tried to expand. The app would ascertain, based on a variety of signals, when cops might be trying to summon an Uber and would prevent them from doing so. Instead, they’d see a special version of Uber – “personalized” – that misinformed them that there were no cars in the vicinity.

How is “personalized learning” – the automation of education through algorithms – a form of “greyballing”? I am really intrigued by this question.

Another piece of the automation puzzle for education (and for “smart car” and for “smart homes”) involves questions of what
we mean by “intelligence” in that phrase “artificial intelligence.” What are the histories and practices of “intelligence” – how have humans been ranked, categorized, punished, and rewarded based on an assessment of intelligence? How is intelligence performed – by man (and I do mean “man”) and by machine? What do we read as signs of intelligence? What do we cultivate as signs of intelligence – in our students and in our machines? What role have educational institutions had in developing and sanctioning intelligence? How does believing there’s such a thing as “machine intelligence” challenge some institutions (and prop up others)?

But I want to press on a little more with a look at automation and labor: this issue of driverless cars and driverless school, this issue of “freedom” as being intertwined with algorithmic decision-making and precarious labor.

I am lifting the phrase “driverless school” for the title of this talk from Karen Gregory who recently tweeted something about the “driverless university.” I believe she was at a conference, but in the horrible way that Twitter strips context from our utterances, I’m going to borrow it without knowing who or what she was referring to and re-contextualize the phrase here for my purposes because that’s the visiting speaker’s prerogative.

I do think that in many ways MOOCs were envisioned – by Thrun and by others – as a move towards this idea of a “driverless university.” And that phrase and the impulse behind it should prompt us to ask, no doubt, who is currently “driving” school? Who do education engineers imagine is doing the driving? Is it the administration? The faculty? The government? The unions? Who is exactly going to be displaced by algorithms, by software that purport to make a university “driverless”?

What’s important to consider, I’d argue, is that if we want to rethink how the university functions – and I’ll just assume that we all do in some way or another – “driverlessness” certainly doesn’t give the faculty a greater say in governance. (Indeed,
faculty governance seems, in many cases, one of the things that automation seeks to eliminate. Think Thrun’s comments on tenure, for example.) More troubling, the “driverlessness” of algorithms is opaque – even more opaque than universities’ decision-making already is (and that is truly saying something).

And despite all the talk of catering to what Silicon Valley has lauded in the “self-directed learner,” to those whom Tressie McMillan Cottom has called the “roaming autodidacts,” the “driverless university” certainly does not give students a greater say in their own education either. The “driverless university,” rather, is controlled by the engineers who write the algorithms, those who model the curriculum, those who think they can best navigate a learning path. There is still a “driver,” but that labor and decision-making power is obscured.

We can see the “driverless university” already under development perhaps at the Math Emporium at Virginia Tech, which The Washington Post once described as “the Wal-Mart of higher education, a triumph in economy of scale and a glimpse at a possible future of computer-led learning.”

Eight thousand students a year take introductory math in a space that once housed a discount department store. Four math instructors, none of them professors, lead seven courses with enrollments of 200 to 2,000. Students walk to class through a shopping mall, past a health club and a tanning salon, as ambient Muzak plays.

The pass rates are up. That’s good traffic data, I suppose, if you’re obsessed with moving bodies more efficiently along the university’s pre-determined “map.” Get the students through pre-calc and other math requirements without having to pay for tenured faculty or, hell, even adjunct faculty. “In the Emporium, the computer is teacher,” The Washington Post tells us.

“Students click their way through courses that unfold in a series of modules.” Of course, students who “click their way
through courses” seem unlikely to develop a love for math or a deep understanding of math. They’re unlikely to become math majors. They’re unlikely to become math graduate students. They’re unlikely to become math professors. (And perhaps you think this is a good thing if you believe there are too many mathematicians or if you believe that the study of mathematics has nothing to offer a society that seems increasingly obsessed with using statistics to solve every single problem that it faces or if you think mathematical reasoning is inconsequential to twenty-first century life.)

Students hate the Math Emporium, by the way.

Despite The Washington Post’s pronouncement that “the time has come” for computers as teachers, the time has been coming for years now. “Programmed instruction” and teaching machines – these are concepts that are almost one hundred years old. (So to repeat, the push to automate education is not about technology as much as it’s about ideology.)

In his autobiography, B. F. Skinner described how he came upon the idea of a teaching machine in 1953: Visiting his daughter’s fourth grade classroom, he was struck by the inefficiencies. Not only were all the students expected to move through their lessons at the same pace, but when it came to assignments and quizzes, they did not receive feedback until the teacher had graded the materials – sometimes a delay of days. Skinner believed that both of these flaws in school could be addressed by a machine, so he built a prototype that he demonstrated at a conference the following year.

Skinner’s teaching machine broke concepts down into small concepts – “bite-sized learning” is today’s buzzword. Students moved through these concepts incrementally, which Skinner believe was best for “good contingency management.” Skinner believed that the machines could be used to minimize the number of errors that students made along the way, maximizing the positive behavioral reinforcement that students received. Skinner called this process “programmed instruction.”

Driverless ed-tech.
“In acquiring complex behavior the student must pass through a carefully designed sequence of steps,” Skinner wrote, “often of considerable length. Each step must be so small that it can always be taken, yet in taking it the student moves somewhat closer to fully competent behavior. The machine must make sure that these steps are taken in a carefully prescribed order.”

Driverless and programmatically constrained.

Skinner had a dozen of the machines he prototyped installed in the self-study room at Harvard in 1958 for use in teaching the undergraduate course Natural Sciences 114. “Most students feel that machine study has compensating advantages,” he insisted. “They work for an hour with little effort, and they report that they learn more in less time and with less effort than in conventional ways.” (And we all know that if it’s good enough for Harvard students…) “Machines such as those we use at Harvard,” Skinner boasted, “could be programmed to teach, in whole and in part, all the subjects taught in elementary and high school and many taught in college.” The driverless university.

One problem – there are many problems, but here’s a really significant one – those Harvard students hated the teaching machines. They found them boring. And certainly we can say “well, the technology just wasn’t very good” – but it isn’t very good now either.

Ohio State University psychology professor Sidney Pressey – he’d invented a teaching machine about a decade before B. F. Skinner did – said in 1933 that,

There must be an “industrial revolution” in education, in which educational science and the ingenuity of educational technology combine to modernize the grossly inefficient and clumsy procedures of conventional education. Work in the schools of the future will be marvelously though simply organized, so as to adjust almost automatically to individual differences and the characteristics of the learning process. There will be many labor-saving schemes and devices, and even machines – not at all for the
mechanizing of education, but for the freeing of teacher and pupil from educational drudgery and incompetence.

Oh, not *replace* you, teacher. To free you from drudgery, of course. Just like the Industrial Revolution freed workers from the drudgery of handicraft. Just like Uber drivers have been freed from the drudgery of full-time employment by becoming part of the “gig economy” and just like Uber will free them from the drudgery of precarious employment when it replaces them with autonomous vehicles.

Teaching machines – the driverless school – will replace just some education labor at first, the bits of it the engineers and their investors have deemed repetitive, menial, unimportant, and let’s be honest, those bits that are too liberal. But it doesn’t seem interested, however, in stopping students from having to do menial tasks. The “driverless university” will still mandate students sit in front of machines and click on buttons and answer multiple choice questions. “Personalized,” education will be stripped of all that is personal.

It’s a dismal future, this driverless one, and not because “the machines have taken over,” but because the libertarians who build the machines have.

A driverless future offers us only more surveillance, more algorithms, less transparency, fewer roads, and less intellectual freedom. Skinner would love it. Trump would love it. But we, we should resist it.
10 THE HISTORY OF THE Pedometer
(AND THE PROBLEM WITH LEARNING ANALYTICS)

These were my remarks as a guest speaker in Donna Murdoch's class at Columbia University’s Teachers College on “Online Teaching and Learning – Applying Adult Learning Principles” on 22 June 2017. I was asked to speak about learning analytics, but like I said in my keynote at NMC (the last chapter of this book), ed-tech is boring. So, this was a talk about pedometers.

“Know thyself” – this is an ancient maxim, of course. But it’s become not so much a philosophy of introspection or reflection but a compulsion for data collection and data analysis. We now live in a culture of quantification. (We have for a while now, no doubt.) All this is aided today, no doubt, by new computing technologies that create and collect massive amounts of personal data.

Learning analytics, in some ways, is a symptom of this data-driven culture – one that also is not new to education. Learning analytics are technologies that support and reflect the idea that we can collect and measure and analyze data about learners in order to know what they know, in order to optimize what and how they learn.

I want to invoke the guest speaker’s privilege and talk about
something slightly different than what I was asked to speak about: that is, learning analytics. Now, I hope you’ll see that almost everything I say is very much related to learning analytics and to education technologies more broadly – to how we’re asked to hand over our personal data to various hardware and software companies, to our employers, to the government, to our schools under the guise of better “outcomes,” more productivity, and so on.

I want to talk a little bit about fitness trackers this evening.

“Wearables,” for what it’s worth, were featured in the 2016 Horizon Report for K–12, an annual report that predicts which education technologies are “on the horizon.” The “Quantified Self” appeared on the 2014 Horizon Report for Higher Education. In both cases, the Horizon Report predicted these technologies were four to five years from widespread adoption.

You hear these sorts of predictions all the time – that everyone is going to own or use X, Y, or Z technology in the next few years – but according to a recent study, only about 10% of Fitbit owners (and that’s of the less than 12% of US consumers own fitness trackers) are still wearing the device after a year.

Beware the marketing hype.

Like all technologies, fitness trackers have a history – one that certainly predates Fitbit or Jawbone or the Nike Fuelband.

There’s some debate about who invented the first pedometer, which remains a core functionality of most activity trackers: that is, counting how many steps one takes per day. Wikipedia lists three possible inventors: Leonardo da Vinci, who sketched the design for a gear-driven device with a pendulum arm that would swing back and forth with every walking leg motion and measure distance traveled; Abraham-Louis Perrelet, a Swiss inventor who built a self-winding watch in 1770 that wound when the wearer walked and then built another device, based on that watch, in 1777 that could measure walking distance; and Thomas Jefferson (Americans
do like stories in which we feature prominently in the invention of things, don’t we), who purportedly brought the first pedometer to the US, although it’s not known if he ever improved on the design as he never filed any patents for his inventions. A website that reviews fitness devices also suggests that Jean Fernel, a French craftsman, might have invented the first pedometer in 1525 or Robert Hooke, an English scientist, might have in 1674, or Hubert Sarton, another Frenchman, might’ve in 1778. It was John Harwood, a British man, who was awarded the first patent for a pedometer in 1924. So even if we date pedometers from that patent, we’re still looking at about 100 years of history; if we credit da Vinci, we’re looking at about 500 years of pedometers.

500 years, and still less than 12% of Americans own a fitness tracker. Be a little skeptical of those who insist that technologies are changing faster than ever or that we’re adopting new technologies more quickly than ever before.

Now, it’s worth asking why so many inventors have been interested in the pedometer concept. For these men I’ve just named, at least, their interest was not in improving “fitness” per se but in measuring distance. For da Vinci, the device had military applications; he also imagined it would help improve mapping.

The promotion of the pedometer as a fitness device started in the 1960s when Dr. Yoshiro Hatano, a professor at the Kyushu University of Health and Welfare, undertook some applied research into exercise and calories. Concerned about the rise in obesity in Japan and wanting to promote and reinforce daily activity as part of “good health,” Hatano began selling a device known as “Manpo-kei” – the 10,000 steps meter. Hatano had calculated that the average Japanese person walked about 3500 to 5000 steps a day. By increasing the number of steps to 10,000 (roughly 5 miles), the number of calories burned obviously would increase as well – up to about 500 calories a day, which could translate into about 20 kilos of weight loss in a year, he claimed. 10,000 steps were, according to the marketing for the Manpo-kei, ideal.
There are plenty of reasons to question that claim. 10,000 steps are less some medically-advised threshold than it is a marketing gimmick. Hatano could have picked 7500 steps or 13,333. 10,000 steps are a nice round number, one that will take you about 100 minutes of moderate activity to accomplish – but it’s also an arbitrary number. 10,000 steps are a goal that’s based on a lot of assumptions about bodies and activity and physical ability too. Nevertheless, the number – and the connection between “steps” and “fitness” – has stuck with us for 50 some-odd years now. 10,000 – that’s the goal that almost all fitness trackers set for us.

And so, we can debate whether or not measuring “steps” is the same as measuring “fitness.” But we should ask too: How well do these devices actually track “steps”? (Rather, how accurate are they in counting “steps” and converting all our physical activity into “steps”?)

Surprise, surprise. They’re far from perfect. It depends on where you wear the device – on your wrist, in your bra, in your pocket, in your purse. It depends on what kind of activity you undertake. A study published in 2013 found that these devices tended to underestimate the energy expended while standing or bicycling or jogging uphill. And it depends on the device, the brand. A recent study from Stanford found that six out of seven wristband activity monitors measured heart rate with an error rate of less than 5%. Not too bad. But none of these monitors measured energy expended – a.k.a. calories – accurately. The most accurate fitness device was off by an average of 27%. Off, in other words, by roughly one McDonald’s Cheeseburger.

These errors are pretty important if you’re making decisions about your diet based on the data you glean from your fitness tracker– like should you have a McDonald’s Cheeseburger or another glass of wine. These errors are really important if someone else is making decisions about you based on this data – like your employer deciding whether your participation in the company wellness program is adequate. Or your health insurance company deciding whether to deny you coverage based on your physical activity or lack thereof. Or your school
tracking how much you exercise and what you eat and how much (and where) you sleep and giving you a grade for it.

Oral Roberts University, for example, beginning in the spring of 2016, encouraged its incoming students to wear a Fitbit and urged them to log their personal data in the learning management system.

Also in 2016, the University of Michigan signed a $170 million deal with Nike. One provision of the contract allows Nike “to harvest personal data from Michigan athletes through the use of wearable technology like heart-rate monitors, GPS trackers and other devices that log myriad biological activities.”

Are these examples of “learner data”? They’re certainly examples of “student data,” right?

Whose data does the data collected by a fitness tracker belong to? What do the Terms of Service say? (You’ve read the Terms of Service, right?) What else, in addition to how many steps a wearer has taken in a day, do these devices track? What does the fitness tracker maker use this data for? Who does the fitness tracker maker share the data with? Who does the fitness tracker maker sell the data to? How long does the company retain it? Can a user request a copy of their data? Can the user delete it? These aren’t medically-approved devices, of course, but what is being collected is, no doubt, sensitive health data. Is that data safe, secure, private? Are there any legal protections regarding this data – that is, does it count as part of someone’s “medical record”?

What are the implications when we compel people – through health insurance or through employment or through the learning management system – to be monitored in this way?

The marketing tells us that this sort of tracking should be done for our own good, for our health and well-being. We should want to track and be tracked. The science? Well, the science, not so much. Indeed, one study published last year in the journal of the American Medical Association, found that those who wore fitness trackers lost less weight than those who did
Yes, that’s just one study. I hear a lot of people say – anecdotal data – that they like their fitness tracker because it motivates them to move. They say they like the “gamification” of exercise – earning points and badges, sharing their efforts via social media, and so on. They insist they need this extrinsic motivation as their intrinsic motivation simply isn’t enough. Not 10,000 steps worth of enough, that is.

And Americans have been tracking calories for quite some time now. Again, there’s a history here – why the calorie is the unit of measurement. Like the invention of the pedometer, there are many origin stories we could tell here – the development of the science of human nutrition in the early twentieth century. I’ll give you one name (because I’ve only mentioned men so far): Lulu Hunt Peters, an American doctor, who published the bestselling diet book *Diet & Health: With Key to the Calories* in 1918 and who popularized the idea that if you counted calories, you can lose weight.

500 years of pedometers. 100 years of counting calories. 50 years of connecting “steps” and “fitness.” Today’s fitness tracker isn’t new, but rather fits quite neatly into a long social and technological history. We are very accustomed to the stories about measuring these data-points for the sake of our personal health and well-being. There’s a cultural logic to the fitness tracker.

Of course, as the familiar saying (often misattributed to Einstein) goes, “Not everything that counts can be counted, and not everything that can be counted counts.”

Is this meaningful data? Are “steps” or “calories” meaningful units of measurement, for example? What can we truly know based on this data? Are our measurements accurate? Is our analysis, based on the data that we’ve collected, accurate? What sorts of assumptions are we making when we collect and analyze this data? Assumptions about bodies, for example. Assumptions about what to count. Assumptions and value judgments about “health”. How much is science, and how much is marketing? Whose data is this? Who owns it? Who
controls it? Who gets to see it? Is this data shared or sold? Is there informed consent? Are people being compelled to surrender their data? Are people being profiled based on this data? Are decisions being made about them based on this data? Are those decisions transparent? Are they done via algorithms – predictive modeling, for example, that tries to determine some future behavior based on past signals? Who designs the algorithms? What sorts of biases do these algorithms encode? How does the collection and analysis of data shape behavior? Does it incentivize certain activities and discourage others? Who decides what behaviors constitute “good health”?

Those are questions we should consider regarding fitness trackers, sure. But they’re questions for all sorts of technologies – education and otherwise.

Please ask these questions when you hear the marketing for “learning analytics.” I’m going to re-state that previous paragraph:

Is this meaningful data? Are “test scores” or “grades” meaningful units of measurement, for example? What can we truly know based on this data? Are our measurements accurate? Is our analysis, based on the data that we’ve collected, accurate? What sorts of assumptions are we making when we collect and analyze this data? Assumptions about bodies, for example. Assumptions about what to count. Assumptions and value judgments about “learning”. How much is science, and how much is marketing? Whose data is this? Who owns it? Who controls it? Who gets to see it? Is this data shared or sold? Is there informed consent? Are people being compelled to surrender their data? Are people being profiled based on this data? Are decisions being made about them based on this data? Are those decisions transparent? Are they done via algorithms – predictive modeling, for example, that tries to determine some future behavior based on past signals? Who designs the algorithms? What sorts of biases do these algorithms encode? How does the collection and analysis of data shape behavior? Does it incentivize certain activities and discourage others? Who decides what behaviors constitute
“a good student” or “a good teacher” or “a good education”?

Are learning analytics (or fitness trackers) a way one can “know thyself”? *What do we think we know, based on them?*
Thank you for inviting me to speak to your class today. I’m really honored to be here at the beginning of the semester, as I’m not-so-secretly hoping this gives me a great deal of power and influence to sow some seeds of skepticism about the promises you all often hear – perhaps not in this class, to be fair, as in your other classes, in the media, in the world at large – about education technology.

Those promises can be pretty amazing, no doubt: that schools haven’t changed in hundreds if not thousands of years and that education technology is now poised to “revolutionize” and “disrupt”; that today, thanks to the ubiquity of computers and the Internet (that there is “ubiquity” is rarely interrogated) we can “democratize,” “unbundle,” and/or “streamline” the system; that learning will as a result be better, cheaper, faster.

Those have always been the promises. Promises largely unfulfilled.

It’s important – crucial even – that this class is starting with history. I’ve long argued that ignorance of this history is part
of the problem with education technology today: that its promises of revolution and innovation come with little to no understanding of the past – not just the history of what technologies have been adopted (or have failed to be adopted) in the classroom before, but the history of how education itself has changed in many ways and in some, quite dramatically, with or without technological interventions. (I’d add too that this is a problem with tech more broadly – an astounding and even self-congratulatory ignorance of the history of the industries, institutions, practices folks claim they’re disrupting.)

I should confess something here at the outset of my talk that’s perhaps a bit blasphemous. I recognize that this class is called “Learning, Media, and Technology.” But I’m really not interested in “learning” per se. There are lots of folks – your professor, for starters – who investigate technology and learning, who research technology’s effect on cognition and memory, who measure and monitor how mental processes respond to tech, and so on. That’s not what I do. That’s not what my work is about.

It’s not that I believe “learning” doesn’t matter. And it’s not that I think “learning” doesn’t happen when using a lot of the ed-tech that gets hyped – or wait, maybe I do think that.

Rather, I approach “learning” as a scholar of culture, of society. I see “learning” as a highly contested concept – a lot more contested than some researchers and academic disciplines (and entrepreneurs and journalists and politicians) might have you believe. What we know about knowing is not settled. It never has been. And neither neuroscience nor brain scans, for example, move us any closer to that. After all, “learning” isn’t simply about an individual’s brain or even body. “Learning” – or maybe more accurately “learnedness” – is a signal; it’s a symbol; it’s a performance. As such, it’s judged by and through and with all sorts of cultural values and expectations, not only those that we claim to be able to measure. What do you know? How do you know? Who do you know? Do you have the social capital and authority to wield what you know or to claim expertise?
My work looks at the broader socio-political and socio-cultural aspects of ed-tech. I want us to recognize ed-tech as ideological, as a site of contested values rather than a tool that somehow “progress” demands. Indeed, that’s ideology at work right there – the idea of “progress” itself, a belief in a linear improvement, one that’s intertwined with stories of scientific and technological advancement as well as the advancement of certain enlightenment values.

I’m interested not so much in how ed-tech (and tech more broadly) might change cognition or learning, but in how it will change culture and power and knowledge – systems and practices of knowing. I’m interested in how ed-tech (and tech more broadly) will change how we imagine education – as a process, as a practice, as an institution – and change how we value knowledge and expertise and even school itself.

I don’t believe we live in a world in which technology is changing faster than it’s ever changed before. I don’t believe we live in a world where people adopt new technologies more rapidly than they’ve done so in the past. (That is argument for another talk, for another time.) But I do believe we live in an age where technology companies are some of the most powerful corporations in the world, where they are a major influence – and not necessarily in a positive way – on democracy and democratic institutions. (School is one of those institutions. Ideally.) These companies, along with the PR that supports them, sell us products for the future and just as importantly weave stories about the future.

These products and stories are, to borrow a phrase from sociologist Neil Selwyn, “ideologically-freighted.” In particular, Selwyn argues that education technologies (and again, computing technologies more broadly) are entwined with the ideologies of libertarianism, neoliberalism, and new forms of capitalism – all part of what I often refer to as the “Silicon Valley narrative” (although that phrase, geographically, probably lets you folks here at MIT off the hook for your institutional and ideological complicity in all this). Collaboration. Personalization. Problem-solving. STEM. Self-directed learning. The “maker movement.” These are all
examples of how ideologies are embedded in ed-tech trends and technologies – in their development and their marketing. And despite all the talk of “disruption”, these mightn’t be counter-hegemonic at all, but rather serve the dominant ideology and further one of the 21st century’s dominant industries.

I want to talk a little bit today about technology and education technology in the 20th century – because like I said, history matters. And one of the ideological “isms” that I think we sometimes overlook in computing technologies is militarism. And I don’t just mean the role of Alan Turing and codebreakers in World War II or the role of the Defense Department’s Advanced Research Projects Agency in the development of the Internet (although both of those examples – cryptography and the Internet – do underscore what I mean when I say infrastructure is ideological). C3I – command, control, communications, and intelligence. Militarism, as an ideology, privileges hierarchy, obedience, compliance, authoritarianism – it has shaped how our schools are structured; it shapes how our technologies are designed.

The US military is the largest military in the world. That also makes it one of the largest educational organizations in the world – “learning at scale,” to borrow a phrase from this course. The military is responsible for training – basic training and ongoing training – of some 1.2 million active duty soldiers and some 800,000 reserve soldiers. That training has always been technological, because soldiers have had to learn to use a variety of machines. The military has also led the development and adoption of educational technologies.
Take the flight simulator, for example.

One of the earliest flight simulators – and yes, this predates the Microsoft software program by over fifty years, but postdates the Wright Brothers by only about twenty – was developed by Edwin Link. He received the patent for his device in 1931, a machine that replicated the cockpit and its instruments. The trainer would pitch and roll and dive and climb, powered by a motor and organ bellows. (Link’s family owned an organ factory.)

Although Link’s first customers were amusement parks – the patent was titled a “Combination training device for student aviators and entertainment apparatus” – the military bought six in June of 1934, after a series of plane crashes earlier that year immediately following the US Army Air Corps’ takeover of US Air Mail service. Those accidents had revealed the pilots’ lack of training, particularly under night-time or inclement weather conditions. By the end of World War II, some 500,000 pilots had used the “Link Trainer,” and flight simulators have since become an integral part of pilot (and subsequently, astronaut) training.

(There’s a good term paper to be written – you are writing a
The military works along a different principle for organizing and disseminating knowledge than does, say, the university or the library. The military is largely interested in teaching “skills.” Or perhaps more accurately, this is how military training is largely imagined and discussed: “skills training.” (Officer training, to be fair, is slightly different.) The military is invested in those skills – and in the teaching of those skills – being standardized. All this shapes the kinds of educational software and hardware that gets developed and adopted.

One of the challenges the military has faced, particularly in the twentieth century, is helping veterans to translate their skills into language that schools and civilian hiring managers understand. This is, of course, the origin of the GED test, which was developed during WWII as a way to assess whether those soldiers who’d dropped out of high school in order to enlist had attained high-school level skills – to demonstrate “competency” rather than rely on “seat time,” to put this in terms familiar to educational debates today. There has also been the challenge of translating skills within the military itself – say, from branch to branch – and within and across other federal agencies. New technologies, to a certain extent, have complicated things by introducing often incompatible software systems in which instruction occurs. And at the end of the day, the military demands regimentation, standardization – culturally, technologically.

I just want to lay out an abbreviated timeline here to help situate some of my following remarks:

1989: Tim Berners-Lee lays out a proposal for "a large hypertext database with typed links"

1992: W3C adopts the HTML standard
1993: The Web browser Mosaic is released
1995: WebCT founded
1997: Blackboard founded
1998: W3C adopts the XML standard
1999: D2L founded

I’m not suggesting here that the Web marks the origins of ed-tech. Again, you’ve read Larry Cuban’s work; you know that there’s a much longer history of teaching machines. But in the 1990s, we did witness a real explosion in not just educational software, but in educational software that functioned online.

In January of 1999, President Clinton signed Executive Order 13111 – “Using Technology to Improve Training Opportunities for Federal Government Employees.” Here’s the opening paragraph, which I’m going to read – apologies – simply because it sounds as though it could be written today:

Advances in technology and increased skills needs are changing the workplace at an ever-increasing rate. These advances can make Federal employees more productive and provide improved service to our customers, the American taxpayers. We need to ensure that we continue to train Federal employees to take full advantage of these technological advances and to acquire the skills and learning needed to succeed in a changing workplace. A coordinated Federal effort is needed to provide flexible training opportunities to employees and to explore how Federal training programs, initiatives, and policies can better support lifelong learning through the use of learning technology.

One of the mandates of the Executive Order was to:

in consultation with the Department of Defense and the National Institute of Standards and Technology, recommend standards for training software and associated services purchased by Federal agencies and
contractors. These standards should be consistent with voluntary industry consensus-based commercial standards. Agencies, where appropriate, should use these standards in procurements to promote reusable training component software and thereby reduce duplication in the development of courseware.

This call for standards — and yes, the whole idea of “standards” is deeply ideological — eventually became SCORM, the Sharable Content Object Reference Model (and one of the many acronyms that, if you work with education technology, will make people groan — and groan almost as much as a related acronym does: the LMS, the learning management system).

Indeed, SCORM and the LMS — their purposes, their histories — are somewhat inseparable. (And I want you to consider the implications of that: that the demands of the federal government and the US military for a standardized “elearning” experience has profoundly shaped one of the foundational pieces of ed-tech that is used today by almost all colleges and increasingly even K–12 schools.)

The SCORM standard was designed, in part, to make it possible to easily move educational content from one learning management system to another. Among the goals: reusability, interoperability, and durability of content and courses. (I’m not going to go into too much technical detail here, but I do want to recognize that this did require addressing some significant technical challenges.) SCORM had three components: content packaging, runtime communications, and course metadata. The content packaging refers to the packaging of all the resources needed to deliver a course into a single ZIP file. The runtime communications include the runtime commands for communicating student information to and from the LMS, as well as the metadata for storing information on individual students. And the course metadata, obviously, includes things like course title, description, keywords, and so on. SCORM, as its full name implies, served to identify “sharable content objects” — that is the smallest unit in a course that contains meaningful learning content by itself
– content objects that might be extracted and reused in another course. The third version of SCORM, SCORM 2004, also introduced sequencing, identifying the order in which these content objects should be presented.

The implications of all this are fairly significant, particularly if we think about the SCORM initiative as something that’s helped, almost a decade ago, to establish and refine what’s become the infrastructure of the learning management system and other instructional software, as something that’s influenced the development as well of some of the theories of modern instructional design. (Theory is, of course, ideology. But, again, so is infrastructure.) The infrastructure of learning software shapes how we think about “content” and how we think about “skills” and how we think about “learning.” (And “we” here, to be clear, includes a broad swath of employers, schools, software makers, and the federal government – so that’s a pretty substantial “we.”)

I will spare you the details of decades worth of debates about learning objects. It’s important to note, however, that there are decades of debate and many, many critics of the concept – Paulo Freire, for example, and his critique of the “banking model of information.” There are the critics too who argue for “authentic,” “real-world” learning, something that almost by definition learning objects – designed to move readily from software system to software system, from course to course, from content module to content module, from context to context – can never offer. I’d be remiss if I did not mention the work of open education pioneer David Wiley and what he has called the “reusability paradox,” which to summarize states that if a learning object is pedagogically useful in a specific context, it will not be useful in a different context. Furthermore, the most decontextualized learning objects are reusable in many contexts, but those are not pedagogically useful.

But like I said at the outset, in my own line of inquiry I’m less interested in what’s “pedagogically useful” than I am in what gets proposed by industry and what becomes predominant – the predominant tech, the predominant practice, the
Learning objects have been blasted by theorists and practitioners, but they refuse to go away. Why?

The predominant narratives today about the future of learning are all becoming deeply intertwined with artificial intelligence. We should recognize that these narratives have been influenced by decades of thinking in a certain way about information and knowledge and learning (in humans and in machines): as atomized learning objects and as atomized, standardized skills.

There’s a long history of criticism of the idea of “intelligence” – its origins in eugenics; its use as a mechanism for race- and gender-based exclusion and sorting. It’s a history that educational psychology, deeply intertwined with the development of measurements and assessments, has not always been forthright about. Education technology, with its origins in educational psychology, is implicated in this. And now we port this history of “intelligence” – one steeped in racism and bias – onto machines.

But we’re also porting a history of “skills” onto machines as well. This is, of course, the marketing used for Amazon’s voice-enabled speaker and digital assistant Alexa. Developers “build” skills. They “teach” skills to the device. And it’s certainly debatable whether many of these are useful at all. But again, that’s not the only way to think about teaching machines. Whether or not something is “pedagogically useful,” here are reasons why the stories about it stick. The narrative about AI and skills is something to pay attention to – particularly alongside larger discussions about the so-called “skills gap.”
Thank you very much for inviting me to your conference. I know there have been lots of murmurs about what it means that someone who’s been quite critical of the Horizon Report project would be invited to speak, let alone to get to offer the closing remarks.

I’ll say at the outset that I’m not here to offer solutions or resolutions or absolutions. The latter’s the job of your priest, and none of these the job of your keynote speaker. I will not be assigning penance today – although as a scholar of history and culture, I do want you (all of us, really) to think about what we’ve done; to think about what we’ve said; to think about the stories we tell about the future of technology and education.

That is the purpose of the Horizon Report, of course: it’s a story about the future. It’s a story designed to share, one you can tell others; and like certain genres of storytelling, it’s one particularly well-suited for urging people to behave in certain ways. It’s one that aspires to shape the future in a certain direction. Or in the seasonally inappropriate words of John
Frederick Coots and Haven Gillespie: *You better watch out, you better not cry / you better not pout / I’m telling you why / artificial intelligence is four to five years on the horizon.*

I spend a lot of time talking about what I call “the history of the future” of education technology. I’m interested in the stories we tell and the stories we have long told about the shape of things to come. (That is to say, the shape of things we believe, we hope, we imagine, we worry, and we predict will come.)

I am interested in how technology functions in those stories as a motif, a symbol, a theme, and sometimes even a protagonist in its own right. I’m interested in how technology functions in those stories as a set of imagined practices, as a reflection of a certain mindset – a mindset that, no matter the sweeping sagas, is bound to and bound by its teller’s contemporaneity. I’m interested in what we believe technology will do. I’m interested in why we believe technology will work, and in why technology is featured so prominently in stories about the future. Why and where.

I realize this is an education conference, but I’m going to shift the “where” of my focus today to stories about the future of technology that take place outside of the school and the classroom. I want to talk about the history of the future of technologies of the home. My rationale is several fold:

First, education technology is boring; or at least its stories, repetitive. You’ve sat here through a couple of days’ worth of presentations on ed-tech, and perhaps you’re a little tired of it too. (Or perhaps I’m projecting.) To borrow from “Norman’s Law of eLearning Tool Convergence,” no matter the stories we tell about innovation, no matter the predictions we make about disruption, in time everything in ed-tech becomes indistinguishable from the learning management system. I do not want to talk about the LMS – not today, not ever to be perfectly frank; not as a portal, not as a “personalized learning environment,” not as a “next generation learning environment,” not as infrastructure, not as ideology, not as a conduit for our failed imagination.
Second, I want to talk about the future of the home because I want us to think about the history of consumer products. Although in many ways, education technology has been more closely associated with what some people call “enterprise technology” – that is, the kinds of mostly administrative software and services sold to large organizations (corporations, governments, K–12 school districts, universities) – education technology is deeply intertwined with consumer tech and trends. I’m not sure those in education technology always want to talk about this consumer framework – we like to pretend we use technology because it will “improve teaching and learning,” not because we’ve been heavily marketed certain products and certain stories about the necessity of our technology consumption. We prefer to think of ourselves as professors or pedagogues or scholars or students, not as consumers or users.

No doubt, today’s technology companies view students and schools as a largely untapped market. But that’s not new. Technology companies – particularly those hawking aspirational, education-related products – have long viewed parents in a similar way. But now “software is eating the world,” as venture capitalist Marc Andreessen wants to us all to believe. That is to say in my mind at least, Silicon Valley ideology – libertarian, individualist, consumerist, capitalist – seeks to mediate all relationships: social, professional, civic, familial.

So, I want to consider the history of technologies of the home – the social and the economic history. What do we expect this technology to do? How does this technology actually function? Who does it benefit? What does it signal? Whose values, whose imagination does it reflect? Who builds it? Who buys it? Whose home is this technological imaginary that we are apt to tout?

Side note: Someone from the Clayton Christensen Institute recently invoked the history of household appliances in an op-ed for Edsurge, asking “Is Your Edtech Product a Refrigerator or Washing Machine?” These two appliances are meant to serve in the article as an analogy for ed-tech adoption –
something about how quickly we embrace products that fit into the home as-is as compared to ones that require we restructure entire rooms and lay new pipes – “incrementalism” versus “transformation,” I suppose. “Reform” versus “revolution.” The historical timeline in the op-ed’s a bit off, historian Jonathan Rees has pointed out, noting that many of us still get by just fine without having a washing machine at home. New technology replacing and displacing and disrupting older technology is not inevitable, no matter how often those from the Clayton Christensen Institute like to tell that story.

Side note to the side note: A press release from early May pronounced that “Global Innovation Guru Clay Christensen Predicts Disruption in the Domain of Parenting.”

Pay attention to these stories. Pay attention to these storytellers. But pay critical attention. Pay attention critically. Ask better questions about why they’re inventing these histories and predicting these futures.

The third reason why I want to talk about technology and the home: I want us to think specifically about technology and labor, about sites of production and reproduction – yes in a Marxist sense – particularly the production and reproduction of knowledge and culture; and I want us to think about love and care. Affective labor. Emotional labor. Who do we imagine is doing this work? Do we value it?

My aim here is to “defamiliarize” a discussion of education technology, shifting the focus so that we can perceive it differently. As I explore with you some technologies of child-rearing (new and old), I want you to think, at every turn, about how these technologies and these practices are prescribed for the home and for the schoolhouse – or at least for some homes and some classrooms.

In January of this year, at the annual Consumer Electronics Show in Las Vegas, Mattel (or rather, its subsidiary Nabi) unveiled Aristotle, a “smart baby monitor” – what it claimed was the world’s first. Companies always hope they’ll be able to make headlines at CES, and Aristotle received a fair amount
of attention this year. There were stories in the usual tech publications – *Engadget*, *PC World*, *CNET* – as well as in the mainstream and tabloid press – *USA Today*, *ABC News*, *Fox News*, *The Daily Mail*. *Bloomberg* heralded the device as “Baby’s First Virtual Assistant.” And here’s how *Fast Company* described the voice-activated speaker/monitor, which is set to launch some time next month (the release day keeps getting postponed):

Aristotle is built to live in a child’s room – and answer a child’s questions. In this most intimate of spaces, Aristotle is designed to be far more specific than the generic voice assistants of today: a nanny, friend, and tutor, equally able to soothe a newborn and aid a tween with foreign-language homework. It’s an AI to help raise your child.

Now that’s obviously a series of sentences that situates the device among its competitors today (those “generic voice assistants”), but that also serves as a very imaginative marketing of a technological future (one where a machine can “aid a tween with foreign-language homework”). It is not a list of *actual* technical specifications. Indeed, since CES the specifications for Aristotle have changed substantially. Mattel has cancelled its integration with Amazon Alexa, for example, which was supposed to power the speaker and facilitate the parts of “parent mode” that involved shopping for baby supplies.

Here’s how the Mattel website, where you can pre-order the device, now describes Aristotle’s features:

Aristotle™ combines multiple nursery devices into one convenient, hands-free system. It’s a smart baby monitor, multi-color LED nightlight, WiFi HD camera, Bluetooth® speaker and sound machine, all in one!

The convenient Aristotle™ App lets you keep a close eye and ear on your baby from your smart device via WiFi internet connection. Easily track and store your baby’s feeding, changing and sleeping patterns, and
receive notifications to alert you of important reminders in real time. You can even find out if your little one is fussy with the cry detector!

With the App’s “Do this When” tool, you can create customized actions that respond automatically to your baby. For example, you can program Aristotle™ to respond to your baby’s cries with a personalized soothing light and sound combination.

There is a lot packed into that marketing material, not just about the specifics of the device for sale but about the cultural and commercial expectations of parenting. It’s also full of buzzwords that will be familiar to those who work in education technology: personalization, analytics, real-time notifications, convenience.

But gone from the Mattel website are the boasts made at CES about what one of its executives said was “the fundamental problem of most baby products, which is they don’t grow with you.” Aristotle was couched in much of the CES coverage as a virtual assistant that would offer, if not “lifelong learning” explicitly, then at least an AI that would learn about the child and teach her as she grew into a teen. All those promises that this $350 device would be something parents would keep in their child’s room long after the supposed need has passed for a “smart baby monitor” – they’re now nowhere to be found. What remains is some fairly boilerplate language about an Internet-connected device.

What happened? Was this a matter of promising too much about a technology? Or did the marketing actually create fear and uncertainty rather than excitement?

(Let’s be clear: these gulfs between marketing’s promises and technologies’ capabilities and consumers’ interests and desires appear regularly. Think the repeated failures of VR or AI to live up to the hype.)

To give you a flavor of what company executives, and in turn technology reporters, gushed about at CES, here’s more from Fast Company, which I apologize for quoting at length, but
it’s amazing how swept up in the story about the future of high-tech parenting that the publication seemed to be:

…It’s the child-to-Aristotle connection that makes the device such an interesting entrant in the rapidly commoditized voice-assistant market. …

Key to that is Aristotle’s ability to understand young voices. “It was one of the core things we tried to resolve from the get-go,” says [one executive]. “Our audience often says words completely differently [even from one another].” To deal with that complication, Mattel partnered with PullString, a San Francisco–based company that focuses on AI conversation and speech recognition. Embedded with PullString’s platform, Aristotle will mature alongside its young listeners, constantly improving its recognition capabilities as children get older. For toddlers, Aristotle will turn its LED various colors and ask the listener to identify them; older kids can ask Aristotle factoids like, “Who was the 16th president of the United States?” or request to play a game.

All of this points at Aristotle’s greater intent: It’s built for play. Mattel is, after all, a toy company with lots of intellectual property. “Imagine what happens with Hot Wheels and Thomas the Tank Engine when you have this connected hub,” says [a Mattel executive] of Aristotle’s future ecosystem. “Do you hear sound effects? Can you have greater interactions?” Mattel imagines that even cheap, simplistic die-cast cars can be loaded with low-cost chips to connect to Aristotle. Meanwhile, the device’s camera will use object recognition to identify flash cards, or even a toy without any special electronics, essentially adding interactions to make it feel more dynamic. The company is aiming to roll out these features early next year.

I mean, I guess we’ll see about that – if any of this particular techno-fantasy ever materializes from Mattel, let alone “early
next year.” We, the reader and consumer, are asked to believe a lot of bullshit in that passage: that the device works, that the AI “learns,” that quizzing children on factoids is a technological and pedagogical breakthrough, that this is the future of play.

Mattel is already selling an Internet-connected Barbie – Hello Barbie – and an Internet-connected Barbie Dreamhouse, much to the consternation of privacy and information security advocates who caution that these devices are incredibly insecure, that the microphone and the stored audio files are readily accessible to hackers. Incidentally, these two Barbie toys use the same voice-recognition technology as the Aristotle: ToyTalk, now rebranded as PullString.

Perhaps we might recognize, as we wait to see if Mattel’s or Clayton Christensen’s predictions about the future come true, that this fantasy of the robot companion or caretaker has its own, long history – stories that elicit fear as often as comfort. There’s Olympia in E. T. A. Hoffmann’s 1816 short story “The Sandman,” for example, which Sigmund Freud used as the basis for his analysis of “the uncanny” – that unsettling feeling of something strangely, frighteningly familiar. “Unheimlich,” Freud observed, is a German word that contains in it an ambivalence: “heimlich” – meaning the home, something familiar, and also something hidden – and its reverse and its pair, “unheimlich” – the unspoken, the repressed. The robot, or rather a seemingly living automaton in “The Sandman,” veers towards “unheimlich.” Making the familiar unfamiliar. The basis for many horror stories.

And yet at CES and elsewhere, technologists insist this is what we will want in the home. (The liberal arts matter, technologists, I promise you.)

Now, the difference between the PR at CES in January and the marketing on the Mattel website in June might be striking, but it’s not really surprising. The point of CES, after all, is not so much to showcase what technology can do but to suggest what it might be able to do. Each and every year, the event is full of promises and vaporware – prototypes that never make it into
production, products that never make it onto store shelves. CES truly encapsulates what I’ve argued elsewhere: that “the best way to predict the future is to issue a press release.” One tells powerful stories about what’s “on the horizon” in order to help shape imaginations and markets. *Imaginations and markets.*

What stories, what forces helped shape the market for baby monitors? Baby monitors have a history, of course – a social history and a history of the technology itself. We did not “need” baby monitors until quite recently, in no small part because our current system of sleeping – adults in one room, children each in their own – did not exist before the late nineteenth century. The idea that babies should sleep alone is even newer, reinforced by the rise of the disciplines of psychology and pediatrics in the early 20th century and by the market for parenting books and child-rearing products that developed alongside the “science.”

The first baby monitor – the “Radio Nurse” – was built by Zenith Radio Corporation in 1937. Zenith’s president, Eugene F. McDonald Jr., had cobbled together his own experimental
system for his yacht using what was already a popular and accessible medium of the time: radio broadcasting. Zenith engineers polished McDonald’s prototype into a two-piece set: the “Guardian Ear,” which was plugged in next to the baby’s crib, transmitted sounds; and the “Radio Nurse,” which was plugged in next to the listening caregiver, received them. Isamu Noguchi, a well-known Japanese-American sculptor, was commissioned to design the latter, something he made out of Bakelite, which according to the curator of the Henry Ford Museum, was “an impressive abstract form that managed to capture the essence of a benign, yet no-nonsense nurse.”

“The essence” of a nurse. A curved plastic box. “Unheimlich.”

The Radio Nurse was never a commercial success; the monitor picked up all sorts of other radio broadcasts, not just those from the baby’s room. Nevertheless, the baby monitor has since become a consumer product that parents are expected to own, often justified as a medical precaution, even though there’s no evidence that these devices prevent or even reduce the risk of sudden infant death syndrome.

Interestingly, infant mortality was not the inspiration for the Radio Nurse – or so the story goes. Zenith’s president felt compelled to build a monitor for his own child following the kidnapping of the Lindbergh baby in 1932.

The “crime of the century” and its trial were covered extensively by newsreels, and the kidnapping of the Lindbergh baby shaped Americans’ imagination. It prompted the passage of several laws relating to abduction. Now, I don’t want to overstate the importance of this particular crime in fostering the notion that babies need more monitoring, particularly in light of the various reform efforts made in the early twentieth century to protect children’s safety and well-being in general. But we can see in the Radio Nurse, I think, a technological intervention to that end – the embrace of a popular story that children are in danger, that they need to be surveilled when they are out of sight for their own protection; and it’s an early embrace too of a story that parenting can and should be mechanized. For the sake of “progress,” the twentieth century
I would be remiss if I neglected to talk at an education technology conference about one of the most controversial “parenting machines” of the twentieth century: the “air crib” designed by behavioral psychologist B. F. Skinner, the infamous trainer of pigeons and inventor of teaching machines. First called the “baby tender” and then – and I kid you not – the “heir conditioner,” the device was meant to replace the crib, the bassinet, and the playpen. (There are echoes of this “efficiency” in Mattel’s Aristotle – “multiple nursery devices” in “one convenient, hands-free system.”)

Skinner fabricated the climate-controlled environment for his second child in 1944. Writing in *Ladies Home Journal* the following year, Skinner said,

When we decided to have another child, my wife and I felt that it was time to apply a little labor-saving invention and design to the problems of the nursery. We began by going over the disheartening schedule of the young mother, step by step. We asked only one
question: Is this practice important for the physical and psychological health of the baby? When it was not, we marked it for elimination. Then the “gadgeteering” began.

The crib Skinner “gadgeteered” for his daughter was made of metal, larger than a typical crib, and higher off the ground — labor-saving, in part, through less bending over, Skinner argued. It had three solid walls, a roof, and a safety-glass pane at the front which could be lowered to move the baby in and out. Canvas was stretched across the bottom to create a floor, and the bedding was stored on a spool outside the crib, to be rolled in to replace soiled linen. It was soundproof and “dirt proof,” Skinner said, but its key feature was that the crib was temperature-controlled, so save the diaper, the baby was kept unclothed and unbundled. Skinner argued that clothing created unnecessary laundry and inhibited the baby’s movement and thus the baby’s exploration of her world.

As a labor-saving machine, Skinner boasted that the air crib meant it only would take “about one and one-half hours each day to feed, change, and otherwise care for the baby.” Skinner insisted that his daughter, who stayed in the crib for the first two years of her life, was not “socially starved and robbed of affection and mother love.” He wrote in *Ladies Home Journal* that

The compartment does not ostracize the baby. The large window is no more of a social barrier than the bars of a crib. The baby follows what is going on in the room, smiles at passers-by, plays “peek-a-boo” games, and obviously delights in company. And she is handled, talked to, and played with whenever she is changed or fed, and each afternoon during a play period, which is becoming longer as she grows older.

Much like the Radio Nurse, the air crib did not catch on, quite possibly because of that very *Ladies Home Journal* article. Its title — “Baby in a Box” — connected the crib to the “Skinner’s Box,” the operant conditioning chamber that Skinner had designed for his experiments on rats and pigeons, thus
associating the crib with the rewards and pellets that Skinner used to modify these animals’ behavior in his laboratory. Indeed, the article described the crib’s design and the practices he and his wife developed for their infant daughter as an “experiment” – a word that Skinner probably didn’t really mean in a scientific sense but that possibly suggested to readers that this was a piece of lab equipment, not a piece of furniture suited for a baby or for the home. The article also opened with the phrase “in that brave new world which science is preparing for the housewife of the future,” and many readers would have likely been familiar with Aldous Huxley’s 1932 novel *Brave New World*, thus making the connection between the air crib and Huxley’s dystopia in which reproduction and child-rearing were engineered and controlled by a techno-scientific authoritarian government. But most damning, perhaps, was the photo that accompanied the article: the Skinner baby enclosed in the crib, with her face and hands pressed up against the glass.

The article helped foster an urban legend of sorts about Deborah Skinner – that being raised in the crib had caused grave psychological trauma, that she’d gone mad, that she’d committed suicide. None of these are true. “I was not a lab rat,” she wrote in an op-ed in *The Guardian* in 2004. But that’s the story that gets told nonetheless. That’s the popular perception of what this particular piece of parenting technology might do: deprive the child of love and socialization.

The air crib, psychologists Ludy Benjamin and Elizabeth Nielsen-Gamman argue, was viewed at the time as a “technology of displacement” – “a device that interferes with the usual modes of contact for human beings, in this case, parent and child; that is it displaces the parent.” It’s a similar problem, those two scholars contend, to that faced by one of Skinner’s other inventions, the teaching machine – a concept he came up with in 1953 after visiting Deborah’s fourth-grade classroom. These technologies both failed to achieve widespread adoption, according to Benjamin and Nielsen-Gamman, because they were seen as subverting valuable
human relationships – relationships necessary to child development.

Now arguably, the most significant (and in some circles, alarming) parenting technology of the twentieth century was neither the baby monitor nor the air crib; it was the television. Children in post-war America were increasingly left alone while their parents were at work, some feared, without adequate adult supervision. (Children being left alone, of course, wasn’t new. But white, middle-class fears about “unaccompanied minors” were heightened for a number of reasons – and no doubt connected to changing cultural expectations and socio-economic pressures regarding working mothers as well as the social construction of a category of young people – “the youth.”) Subsequently (or ostensibly) children were being “raised,” educated, entertained by television – again, a technology that people worried might serve to undermine healthy childhood development by displacing parental authority, by exposing them to “inappropriate content” and to commercials.

Some of that moral panic has extended these days to other “screens,” even though American children do still watch a phenomenal amount of television – 19 hours a week for those age 2 to 11, according to the latest figures from Nielsen – much of it “unsupervised.” But one of the promises of new screens and new parenting technologies: unlike the television, these can watch children back. Again, I give you the marketing materials from Mattel: “The convenient Aristotle App lets you keep a close eye and ear on your baby from your smart device.” You can monitor the sounds the child makes through the microphone; you can monitor the movements the child makes through the camera; you can monitor all activity – physical and digital – through the computer’s activity logs. You can monitor them wherever they go without you: in their bedroom, in their classroom.

These new parenting devices try very hard to convince us that they are not a “technology of displacement,” but rather one of enhancement. They insist they do not interfere with parental relationships but enable them and extend their reach, even in a
parent’s physical absence. This is not a matter of *replacing* parents with machines, but rather *augmenting* parenting with machines. As Stirling University’s Ben Williamson describes Mattel’s Aristotle, the “smart baby monitor” purports to be “the algorithmic solution to many parents’ problems – the automated in-loco-parentis figure that possesses endless energy, requires no sleep, does the shopping, and keeps the baby entertained and educated in ways that exceed human capacity.”

This argument should be quite familiar to those of us in ed-tech. This is the story we hear and we tell about computers, about algorithmic systems like adaptive learning, predictive analytics, personalization. Enhance, not replace. It’s the story B. F. Skinner told some sixty years ago about teaching machines too. “Will machines replace teachers?” he asked. “On the contrary,” he said,

> they are capital equipment to be used by teachers to save time and labor. In assigning certain mechanizable functions to machines, the teacher emerges in his proper role as an indispensable human being. He may teach more students than heretofore – this is probably inevitable if the world-wide demand for education is to be satisfied – but he will do so in fewer hours and with fewer burdensome chores.

“Chores” – an interesting word choice, one that posits the work of the classroom alongside the work of the home. It’s not really clear in this passage by Skinner what these tasks might be. What are “mechanizable functions” and what, by extension, are not? In the case of Mattel’s Aristotle, these functions seem to include not only monitoring a sleeping child, alerting a parent to her cries, but playing with the child, comforting the child, talking and singing and reading to the child.

Raising a child, this story suggests, can be mechanized. Interacting with a child can be mechanized. Caring for a child can be mechanized. That’s quite an unsettling story, I think. “Das unheimlich.” But *Fast Company* likes it. And perhaps if
people tell us the story often enough, they’ll change the way in which we all think. Maybe they’ll change how we think about robots. Maybe they’ll change how we think about parenting.

Indeed, last week I was on stage with someone from Singularity University, a Silicon Valley think tank co-founded by Ray Kurzweil, who insisted that this would be our future: we will love and be loved by robots. We will be raised by robots. (She cited Mattel’s Aristotle as an example.) We will be taught by robots. We will age and we will die with robot caretakers.

But robots don’t love. Robots don’t care. They don’t now; they never will – no matter the stories futurists tell us. “I think eventually [robots will] be able to act just like they are falling in love,” Google AI expert Peter Norvig told The Daily Beast in 2013 in response to the Spike Jonze movie Her. But is being programmed to act like love the same as love?

This is a philosophical question, to be sure. But it’s a political one as well, I’d contend, and maybe a pedagogical one too. And it’s a question we must ask, particularly as companies try to extend their reach with their products and their promises of thinking machines. How might programmatic, algorithmic child-raising technologies change our notions of love, of care, of humanity? How might they already be doing precisely that?

Through their design and their implementation, through the way in which they incentivize certain activities, technologies shape and reshape our practices and our relationships. They shape our imaginations, and technologies in turn are shaped by the imaginative stories we tell and we hear, by our beliefs and our practices.

Will a robot raise your child? Sixty years ago, when B. F. Skinner was trying to convince families and schools to buy air cribs and teaching machines, the answer from parents and teachers was overwhelmingly “No.” But now?

I’m not sure we are as resistant to the language of engineering and optimization, even in our most intimate spaces and relationships. It’s not that the technology is better either.
Mostly, it’s not. New technologies, and the ideologies that underpin them, have brought the language of efficiency and productivity out of the workplace and into the classroom and into the home – into the realm of reproductive labor. Everything becomes a data-point to be tracked and quantified and analyzed and adjusted as (someone deems) necessary. Everything must be made perfectly observable, even when no human is there to watch.


All of this will be facilitated by “smart devices” in our “smart homes” under the guise of engineering (and that is the operative word) “smart children.” New, networked systems will optimize parenting and child development algorithmically. Or so we’re told.

It seems quite likely that the ways in which a white child from an affluent two-parent family would experience these parenting and education technologies would be quite different from the way in which a brown child with a poor single mom would. (There are no people of color in any of the images I used today. This science fiction imaginary. Did you notice?) A brave new world indeed.

We’re supposed to be thrilled about this “enhancement.” Or so I gather from the marketing for parenting and education technologies. So we’re told by CES. So we’re told by the Horizon Report.

Somewhere along the way, I think, we have confused surveillance for care. This is not necessarily a recent or emergent phenomenon – we can trace it back, at the very least, to the Radio Nurse and this compulsion to monitor our babies. This confusion – surveillance for care – has profound implications for how we raise children, no doubt. It has profound implications for how we teach and learn. It has
profound implications for how we trust and respect one another.

Love and care and respect for one another – I’m an idealist, yes – that must be the work of all humans. That is the work of parenting (even for non-parents). That is the work of teaching too. I truly, truly hope we never convince ourselves that this can, that this should be the work of a machine.
I don’t recall who first described me as “ed-tech’s Cassandra.” It’s not a moniker I’d have chosen for myself. I know what happens to the daughter of King Priam and Queen Hecuba. I’m a folklorist after all. When I joke about my supposed role as a Cassandra, it’s with a nervous kind of laughter – laughter that tries to mask the horror of recognizing the dangers we’ve found ourselves in and the frustration of understanding no one will listen to my warnings. It’s a laughter that wants to forget the fallout.

It’s never particularly fun to say “I told you so.” I don’t relish being right – not about monsters.

When I was little, I used to have terrible nightmares – monsters and snakes and sharks. I developed a number of rituals before going to bed – or my mother helped me do so. I’d check under the bed. (Or she would check under the bed). I’d check in the closet. (Or she would check in the closet.) After an “all clear,” the closet door would be closed. There were no door knobs on the inside. Nothing could get out, I’d reassure myself. (Or my mother would reassure me.) To this day, I still insist on sleeping with the closet doors tightly shut.

I’m not afraid of the dark. I never have been. The darkness isn’t the problem; it’s the monsters. And monsters aren’t always afraid of the light.

I taught myself a trick as a little girl in order to deal with the bad dreams: I’d remind the monsters in my head that I was in
charge of the story. Even if they were frightening (and especially if they were frightening), I’d stop the dream like I was the director of a film. I didn’t exactly yell “cut,” but I’d give instructions to the various characters in my dream on how the story should actually proceed. I learned to shape the narrative.

We are not powerless against monsters – real or imaginary. We can do something. We can confront them. We can alter and dismantle the systems and structures that foster them. We can change the story.
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REFERENCES


For a complete list of references, including links to digital versions of much of what is listed above, see the original transcripts on Hack Education (hackeducation.com). Those transcripts also include images not included in this book. (Yes, there is a difference between print and PowerPoint.) Thanks to Alan Levine and to Wikipedia for openly licensing their photographs so I can easily use them in my work.
ABOUT THE AUTHOR

Audrey Watters is a writer and independent scholar who focuses on education technology -- its politics and its pedagogical implications. Although she was two chapters into her Comparative Literature dissertation, she decided to abandon academia, and she now happily fulfills the one job recommended to her by a junior high aptitude test: freelance writer. She has written for *The Baffler, The Atlantic*, and elsewhere across the Web, but she is best known for her work on her own website Hack Education. She has given keynotes and presentations on education technology around the world and is the author of several books, including *The Monsters of Education Technology*, *The Revenge of the Monsters of Education Technology*, *The Curse of the Monsters of Education Technology*, and *Claim Your Domain*. She is a recipient of the Spencer Education Journalism Fellowship at Columbia University School of Journalism for the 2017-2018 academic year.